

# STUDY AREA SCREENING EVALUATION ADDENDUM

for

# SITE 19 – ON-SHORE DERECKTOR SHIPYARD

NAVSTA, Newport, Rhode Island



# Naval Facilities Engineering Command Mid-Atlantic

Contract Number N62470-08D-1001 Contract Task Order WE20

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# STUDY AREA SCREENING EVALUATION ADDENDUM FOR

SITE 19 - ON-SHORE DERECKTOR SHIPYARD

NAVSTA, NEWPORT, RHODE ISLAND

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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### **ACRONYMS**

ACH air changes per hour

ATSDR Agency for Toxic Substances and Disease Registry

ADAFs age-dependent adjustment factors

B&RE Brown & Root Environmental

bgs below ground surface

BRAC Base Realignment and Closure

BTV background threshold value

Cal EPA California Environmental Protection Agency

CERCLA Comprehensive Environmental Response Compensation and Liability Act

CLEAN Comprehensive Long-Term Environmental Action Navy

COC Chemicals of concern

COPC chemicals of potential concern

CSF cancer slope factor

CSM conceptual site model

CTE central tendency exposure

CTO Contract Task Order

DAF dilution attenuation factor

DEC direct exposure criteria

DO dissolved oxygen

DPT direct push technology

DRO diesel range organics

EPC exposure point concentration

EU exposure unit

FS Feasibility Study

Ft. feet

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GC/FID gas chromatography/flame ionization detector

GRO gasoline range organics

HEAST Health Effects Assessment Summary Tables

HHRA human health risk assessment

HI hazard index

HQ hazard quotient

HSA hollow stem auger

ID inside diameter

IEUBK Integrated Exposure Uptake Biokinetic

ILCR incremental lifetime cancer risk

IRIS Integrated Risk Information System

IUR inhalation unit risks

L liter

LNAPL light non-aqueous phase liquids

LPDE low density polyethylene

MCL maximum contaminant level

mg/kg milligrams per kilogram

ml/min milliliters per minute

MRL Minimal Risk Level

mw monitoring well

NAD North American Datum

NAVSTA Naval Station

Navy U.S. Department of Navy

NCEA National Center for Environmental Assessment

NGVD National Geodetic Vertical Datum

NTCRA Non-time critical removal action

NTU Nephelometric Turbidity Units

NUSC Naval underwater Systems Center

OD outside diameter

OHM OHM Corporation

ORNL Oak Ridge National Laboratory

ORP oxidation-reduction potential

PA Preliminary Assessment

PAH polynuclear aromatic hydrocarbon

PAL project action levels

PCB Polychlorinated biphenyl

PE Polyethylene

PEF particulate emissions factor

PID photoionization detector

ppm parts per million

PPRTVs Provisional Peer Reviewed Toxicity Values

PVC polyvinyl chloride

QA/QC Quality Assurance/Quality Control

RAGS Risk Assessment Guidance for Superfund

RBC risk-based concentration

RCRA Resource Conservation Recovery Act

RDA recommended daily allowance

RDI recommended daily intake

RfC reference concentration

RfD reference dose

RI Rhode Island

RIDEM Rhode Island Department of Environmental Management

RME reasonable maximum exposure

RSLs Regional Screening Levels

SASE Study Area Screening Evaluation

SG soil-gas

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SOPs standard operation procedures

SSL soil screening level

SVOC semi-volatile organic compounds

TAL Target Analyte List

TCLP toxicity characteristic leaching procedure

TEF toxicity equivalent factors

TP test pit

TPH total petroleum hydrocarbon

Tetra Tech Tetra Tech, Inc.

UCL upper confidence limit

UPL Upper Predictive Limit

USCG U.S. Coast Guard

USCS Unified Soil Classification System

USEPA U.S. Environmental Protection Agency

USMC U.S. Marine Corps

UST underground storage tanks

VDEQ Virginia Department of Environmental Quality

VF volatilization factor

VISL Vapor Intrusion Screening Level

VOC volatile organic compounds

yr year

μg/L micrograms per liter

μg/kg micrograms per kilogram

Executive Summary Addendum 1 FINAL

# **EXECUTIVE SUMMARY**

This Study Area Screening Evaluation (SASE) Addendum was prepared by Tetra Tech, Inc., (Tetra Tech) for the U.S. Department of Navy (Navy) to document onshore field work conducted as part of additional sampling activities for Site 19, On-Shore Derecktor Shipyard (the Site) at Naval Station (NAVSTA) Newport, Rhode Island. This report is an addendum to the *On-Shore Site Assessment Screening Evaluation, Former Derecktor Shipyard, Naval Education & Training Center, Newport, Rhode Island* (Brown and Root Environmental [B&RE], 1997). The objectives of this SASE Addendum are to obtain analytical data where data gaps were identified by the Navy and regulatory agencies. Analytical data were used to revise the 1997 SASE human health risk assessment (HHRA) and to provide a recommendation on a path forward for the Site.

The Site consists of undeveloped areas, foundations of former buildings, temporary offices, parking areas, storage areas utilized by the U.S. Coast Guard (USCG) for buoy maintenance, and on-going construction projects (USCG Buoy Tender Waterfront). The 1997 SASE divided the Site into five subareas; the Northern Waterfront, the Central Shipyard, the polychlorinated biphenyl (PCB) removal area, the Building 234 Area, and the Southern Waterfront.

The Site was utilized by the Navy for shipbuilding activities from 1962 to 1978, and subsequently by a privately operated ship maintenance and construction facility from 1979 to 1992. A Preliminary Assessment (PA) was conducted in May 1993 that identified several areas of concern where additional investigations were recommended. In 1997 a SASE was completed which included soil and groundwater sampling activities. The SASE summarized analytical data and calculated risk to human health through the completion of a baseline HHRA. Recommendations included excavation of "hot spots" and filling of sumps and trenches. Various removal actions were conducted from 1997 to 2007 to address the recommendations contained in the SASE Report.

Analytical results of the 2011 soil, groundwater, and soil gas samples collected from the five areas of the Site are summarized as follows. Soil samples in the Southern Waterfront contained six metals above U.S. Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs). Volatile organic compounds (VOCs) were detected in groundwater with trichloroethene (TCE) exceeding the USEPA maximum contaminant level (MCL) in five Northern Waterfront wells. In the Central Shipyard, arsenic in groundwater was detected above the MCL. Soil samples collected in the PCB removal area documented PCB, polynuclear aromatic hydrocarbons (PAHs), and metals above RSLs. Soil samples collected in the Northern Waterfront detected PAHs and metals above RSLs and soil gas samples detected five VOCs above USEPA soil gas criteria.

The SASE HHRA was revised using historical soil data and current soil, groundwater and soil gas data. Arsenic was the major contributor to the hazard index (HI) for hypothetical child residents exposed to subsurface soil at the PCB removal area. TCE was the major contributor to the HI for hypothetical child and adult residents exposed to groundwater at the North Waterfront. Manganese was the major contributor to the HI for future industrial workers exposed to groundwater at the Central Shipyard. Arsenic, cobalt, iron, and manganese were the major contributor to the HI for hypothetical child and adult residents exposed to groundwater at the Central Shipyard. Manganese was the major contributor to the HI for hypothetical child residents exposed to groundwater at former Building 234.

Cancer risks exceeding USEPA cancer risk range (10<sup>-4</sup> to 10<sup>-6</sup>) was determined for hypothetical residents in one area for groundwater and in two areas for soil. In addition, cancer risks exceeding the RIDEM cancer risk threshold of 10<sup>-5</sup> was determined for hypothetical receptors in each area and for current industrial workers in two areas and future industrial workers in three areas, and future trespassers in the PCB Removal Area.

The following table summarizes carcinogenic risks that exceed the USEPA cancer target risk range.

Area	Medium	Receptor	Contaminant Contributing to Cancer Risk
Central Shipyard	Groundwater	Future Industrial Workers (2E-04) Hypothetical Child Residents (6E-04) Hypothetical Adult Residents (1E-03) Hypothetical Lifelong Residents (2E-03)	Arsenic
Building 234	Surface Soil	Hypothetical Child Residents (3E-04) Hypothetical Lifelong Residents (4E-04)	PAHs, arsenic, chromium
PCB Removal Area	Surface Soil	Hypothetical Child Residents (5E-04) Hypothetical Lifelong Residents (5E-04)	PAHs, arsenic
	Subsurface Soil	Hypothetical Lifelong Residents (2E- 04)	PAHs, arsenic, chromium

The On-Shore Derecktor Site is currently located on an active portion of NAVSTA Newport. Several construction projects are being conducted at the site to improve the site for future Navy and USCG use. Future land use will not include residential use due to the industrial nature of the site and on-going Navy infrastructure constructions plans.

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The conclusions of the risk assessment determined that risk under the residential use scenario is present for soil and groundwater. Risk under the future industrial user scenario is present due to inadvertent ingestion of groundwater containing arsenic and manganese. Several removal actions have been conducted at the site to remove sources of contamination present from previous site uses.

This SASE Addendum fulfills the role of a Remedial Investigation for this site because this report, coupled with the previous SASE report, contains the risk assessment component required by CERCLA. Based on the risks estimated for the residential and industrial workers scenarios, it is recommended that the Site be carried forward to a Feasibility Study (FS) step which will evaluate remedial alternatives for soil and groundwater.

### 1.0 INTRODUCTION

This Study Area Screening Evaluation (SASE) Addendum was prepared by Tetra Tech, Inc., (Tetra Tech) for the U.S. Department of Navy (Navy) to document onshore field work conducted as part of additional sampling activities for Site 19, On-Shore Derecktor Shipyard (the Site) at Naval Station (NAVSTA) Newport, Rhode Island. This addendum is a supplement to the *On-Shore Site Assessment Screening Evaluation, Former Derecktor Shipyard, Naval Education & Training Center, Newport, Rhode Island* (B&RE, 1997). Tetra Tech is conducting this work at the request of the Navy under Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62470-08-D-1001, Contract Task Order (CTO) WE20.

The Site was utilized by the Navy for shipbuilding activities from 1962 to 1978, and subsequently by a privately operated ship maintenance and construction facility from 1979 to 1992. In May 1993 a Preliminary Assessment (PA) was conducted by Halliburton NUS Corporation and ENSR Consultants and Engineers. The PA identified several areas of concern, identified by visual observations and a review of historical records for the Site, where additional investigations were recommended. Soil and groundwater sampling activities were conducted throughout the Site as part of the SASE completed in 1997. The SASE summarized analytical data and calculated risk to human health through the completion of a baseline human health risk assessment (HHRA). Recommendations generated from the SASE included excavation of "hot spots" and filling of existing sumps and trenches. Various removal actions were conducted from 1997 to 2007 to address the recommendations contained in the SASE Report.

# 1.1 SITE LOCATION

The On-Shore Derecktor Shipyard is located at NAVSTA Newport, adjacent to the eastern portion of Coddington Cove, Narragansett Bay, as illustrated in Figure 1-1. The Site consists of undeveloped areas, relic foundations of former buildings, temporary offices, parking areas, storage areas utilized by the U.S. Coast Guard (USCG) for buoy maintenance, and on-going construction projects (USCG Buoy Tender Waterfront) as depicted in Figure 1-2. Additional site information regarding the operational history of activities at the Site can be found in the 1997 SASE Report (Brown & Root Environmental [B&RE] 1997).

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#### 1.2 PROJECT OBJECTIVES

The project objectives of the SASE Addendum are to collect additional samples and obtain analytical data from areas where data gaps were identified by the Navy, the U.S. Environmental Protection Agency (USEPA) and the Rhode Island Department of Environmental Management (RIDEM). This data and historical site data will be used to revise the 1997 baseline HHRA and to provide recommendations for any additional work for the Site.

Additional groundwater and soil analytical data was generated from five areas of the Site which included the following:

- Southern Waterfront
- Building 234 Area
- Central Shipyard (Building 42)
- Polychlorinated biphenyl (PCB) Removal Area (Building 6/Test Pit 14 Area and Transformer Bank)
- Northern Waterfront (includes the Huts 1 and 2 Area)

The baseline HHRA was revised to incorporate changes in the risk assessment methodology since the original HHRA was prepared according to current Navy and USEPA risk assessment guidance documents. In addition, the vapor intrusion pathway is evaluated, through the collection of soil gas samples from the Northern Waterfront.

#### 1.3 SASE ADDENDUM REPORT ORGANIZATION

This SASE Addendum serves to supplement the 1997 SASE Report and, as such, the reader is referred to the 1997 SASE Report for detailed information on the background and operational history of the site, previous investigations (e.g. PA), geology and hydrogeology, and fate and transport of contaminants.

This SASE Addendum is organized into six sections, with tables and figures presented following the document text:

- Section 1.0 of the report outlines the project objectives and the organization of the SASE Addendum Report.
- Section 2.0 provides a discussion of the 1997 SASE findings along with an overview of the removal activities previously conducted at the Site.

- Section 3.0 presents an overview of the field investigations conducted as part of this SASE
   Addendum designed to assess existing data gaps in environmental media quality at the Site.
- Section 4.0 presents an assessment of environmental media impacts from contamination identified at the Site.
- Section 5.0 presents the results of the baseline HHRA.
- Section 6.0 provides the summary and conclusions from investigation efforts conducted under this SASE Addendum.

#### 2.0 PREVIOUS SITE ACTIVITES

This section presents a summary of previous environmental investigations conducted at the Site.

#### 2.1 1997 SASE INVESTIGATION

The SASE investigation was conducted to determine the presence of contaminants in the soils and groundwater in the areas of concern previously identified by the Derecktor Shipyard PA (Halliburton NUS, 1993). As part of this investigation, 28 test pits were excavated and 25 soil borings were advanced, eight of which were completed as permanent groundwater monitoring wells. Soils were evaluated using field-screening instruments and visual observations, and samples of suspect soils were delivered to an analytical laboratory for chemical analysis and reporting. In addition, eight groundwater samples were collected and submitted for laboratory analysis and reporting.

#### Findings of the SASE Investigation

Soil sample analysis confirmed the conclusions of the PA that surficial discharge of various contaminants had occurred at several locations across the Site. Much of the contamination in site soils was localized and apparently related to surficial releases. Low concentrations of contaminants were also detected in groundwater samples collected at the Site. The SASE findings are summarized below:

- Elevated concentrations of phenolic compounds and polynuclear aromatic hydrocarbon (PAH) compounds were detected in soil samples from test pit (TP) 16 and TP17 in the area around two structures (Huts 1 and 2). The evaluation of data determined that the contaminants were likely associated with the former vehicle maintenance operations that were performed in this location.
- Elevated concentrations of PCBs, PAHs, and metals were found in soils from unpaved areas northeast of Building 6 (TP14), which received surface runoff from an adjacent railroad right-of-way, a former electrical transformer pad, and the paved areas east of Building 6 where transformers had reportedly been stored. In addition, the former "pipe shop" was located in the northeast corner of Building 6 and it was suspected that wastes generated from related operations were discharged to soils in this area.
- Slightly elevated concentrations of PAHs and metals were found in soils from the former location of a bilge water disposal area north of Building 42 (monitoring well [MW]05).
- Slightly elevated concentrations of pesticides and leachable metals were detected in soils from the area south of Building 42 (MW07 and TP11), which was a former bulk material storage area.
- Elevated concentrations of phthalate compounds were detected in the soils south of Building 234 (TP07 and TP08), which was an area of suspected chemical discharge described in the PA report.

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- High concentrations of semi-volatile organic compounds (SVOCs) and butyltin compounds were detected in the soils under Building 42, apparently due to past discharges from sumps within the building.
- Petroleum-related contaminants were found in soils from the former parking area, east (upgradient) of Huts 1 and 2; however, the contamination appeared to be the result of upgradient releases from former underground storage tanks (USTs) at Building 62. This area was investigated as part of a separate study.
- Low concentrations of petroleum fuel components were detected in the shallow soils north of Building
   234. Components were believed to be residual contaminants from former USTs in this area.

# Findings of the Risk Evaluation Assessment

A HHRA was performed in 1997 to identify risks to potential receptors at the Site. The current potential receptors evaluated were limited to persons working at the Site on a full-time basis, as well as potential trespassers on the Site. Future receptors evaluated included industrial workers, excavation workers, trespassers, and residents. The primary contributors to calculated risk were arsenic (all areas) and PCBs (from surface soils north of Building 6).

Arsenic is a naturally occurring element in soil and groundwater in Rhode Island, related to the character/mineralogy of the geologic units in the area. A risk-based acceptable (target) level for arsenic in soils has been set by RIDEM, for industrial properties. Many samples of soil at and upgradient of this and other Sites on Aquidneck Island have been found to exceed this target level.

PCBs were found at elevated concentrations in soils north of Building 6. Industrial workers in this area may be exposed to these surface soils, which could cause an increased risk of cancer above the USEPA recommended target level of one in one-hundred thousand for incremental cancer risk.

# Recommendations of the Site Assessment Screening Evaluation Report

Recommendations of the SASE included performing limited soil excavations at several areas found to have elevated concentrations of chemical contaminants. These areas were located to the northeast of Building 6, where the risk evaluation showed an increased risk from PCBs present in the soil and the soils under Building 42 which were found to be contaminated with paint residues. Finally, some of the drainage systems under the Building 234 foundation and south of Building 42 were recommended for dismantling or repair, depending on the plans for future use of these specific areas.

#### 2.2 REMOVAL ACTIVITIES

In August 1995, NAVSTA Newport contracted with OHM Corporation (OHM) to conduct a removal action to excavate and dispose of sandblast grit that was known to be present on the ground to the north and east of Building 42. OHM removed this material and covered the exposed ground with a sand and crushed stone mix. As part of this effort, the embankment to the east of Building 42 was excavated and repaired.

Various removal actions were conducted by Foster Wheeler Environmental Corporation (subsequently known as Tetra Tech EC, Inc.) from 1997 through 2007. These actions included the following:

- Southern Waterfront Berm Removal. A berm containing construction debris and soil located in the southern waterfront area was removed. Prior to removal, the berm was divided into six equal sections, which were described as Sections 1 through 6. Soils from each section were removed and stockpiled for composite sampling prior to disposal. Samples were analyzed for volatile organic compounds (VOCs), SVOCs, PCBs, metals, and total petroleum hydrocarbons (TPH). Exceedances of RIDEM direct exposure criteria were noted for SVOCs and arsenic. Under an agreement between Navy and RIDEM, stockpiles containing arsenic concentrations above 12 parts per million (ppm) and lead above 150 ppm were disposed off-site. Shoreline restoration activities were conducted after the removals.
- Building 42 S42-1 Sump Pit Removal. Surficial soils associated with Sump 1, located beneath former Building 42, were removed to a depth of one foot below ground surface (bgs). Confirmatory samples for VOCs, SVOCs, PCBs, pesticides, metals, and TPH laboratory analyses and reporting were collected following the excavation. Analytical results detected concentrations of arsenic from 15 ppm to 22 ppm which exceeded RIDEM direct exposure criteria (DEC).
- Test Pit 14 PCB Contaminated Soil Removal. A series of excavations and confirmatory sampling was conducted to delineate and remove PCB-contaminated soils. Confirmation samples detected the presence of PCBs, lead, arsenic, and TPH above RIDEM DECs. Approximately 430 tons of PCB-contaminated soil was removed from the Test Pit 14 area.
- Building 42 S42-5 Sump Investigation and Removal. A concrete sump and associated valve chamber were removed. Approximately 42 tons of concrete debris and associated piping were disposed. At the completion of removal activities, confirmation samples for VOCs, SVOCs, PCBs, metals, and TPH were collected for laboratory analysis and reporting. One location had SVOC and arsenic exceedances of RIDEM DEC.
- Exploratory Trenching, Former Disposal Pits. Three exploratory trenches were excavated north of former Building 42 (i.e. bilge water disposal area). Based on sample analysis of the soil excavated from the trenches, a hotspot removal was conducted at one location. The hotspot removal action included the removal and disposal of approximately 25 cubic yards of soil.

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• Sandblast Grit Removal. A series of removal actions were conducted north of Building 6 in the vicinity of a new watchtower to remove subsurface sand blast grit.

## 3.0 FIELD INVESTIGATIONS

This section describes the field investigation activities implemented as part of the SASE Addendum for the Site. Field tasks, implemented in accordance with the Work Plan Addendum (Tetra Tech, 2011), were conducted by Tetra Tech personnel in February and March of 2011. This section is supported by a series of appendices including:

<u>Appendix A</u> – Field Documentation Forms

Appendix B – Soil Boring and Monitoring Well Construction Logs

Appendix C - Field Modification Records

Appendix D - USEPA low flow standard operation procedures (SOPs)

Appendix E – 2011 Analytical Data Results

Field investigation activities conducted at the Site are summarized in Sections 3.1 through 3.3. The overview of the investigation activities presented below includes; number of samples, locations of samples, types of laboratory analyses, rationale for each location, and field observations and measurements. Samples were collected and analyzed in accordance with the quality assurance/quality control (QA/QC) criteria defined in the Work Plan Addendum (Tetra Tech, 2011).

#### 3.1 SOIL INVESTIGATIONS

Soil samples were collected at the Site to evaluate different target areas and different potential sources of contaminants. This field effort included the advancement of soil borings at several target areas at the Site, as illustrated in Figure 3-1.

Drilling activities were conducted at the Site in order to characterize the overburden geology, to collect surface and subsurface soil samples for laboratory analysis, and for the installation of permanent groundwater monitoring wells. The following subsections provide an overview of the soil boring investigation and summary of the field measurements and observations made during soil boring advancement activities.

### 3.1.1 <u>Overview of Soil Borings</u>

A total of 17 soil borings were advanced at the Site for the purpose of characterizing soils, and an additional nine soil borings were advanced for the purpose of installing permanent groundwater monitoring wells. The soil boring and permanent monitoring well locations are shown on Figure 3-1.

Boring logs from this effort describing localized soils are presented in Appendix B. A soil boring sample summary is presented on Table 3-1 and a summary of borings and the rationale for each location is provided on Table 3-2.

Soil borings were advanced using direct push technology (DPT), hollow stem auger (HSA) drilling techniques, or hand augers. The soil borings were advanced in accordance with the procedures specified in the approved Work Plan Addendum, except for the following field modifications as documented in field modification records presented in Appendix C.

- Overburden groundwater was not encountered in the original upgradient location of MW223 located in the Naval Underwater Systems Center (NUSC) Fleet Parking area. The bedrock aquifer is considered to be interconnected with the overburden aquifer in the Northern Waterfront; therefore, MW223 was screened in bedrock.
- Monitoring well locations MW221 and MW222 were shifted to the west away from the unnamed road due to traffic safety concerns.
- Monitoring well location MW220 was relocated due to on-going waterfront construction to the south away from the construction zone.
- Soil boring SB218 was renamed SB224 to remove any potential confusion with monitoring well MW218.
- MW11 was a historical permanent monitoring well that was advanced using HSA drilling techniques. During the most recent field event, the monitoring well could not be located and it was determined to be either destroyed or inaccessible. A temporary well point (MW11A) was installed using DPT to collect groundwater and soil gas samples from that location. The original monitoring well (MW11) was screened from 19 to 29 feet (ft.) bgs. The replacement well screen length was adjusted to 5 to 10 ft. bgs due to 1) reaching refusal at shallower depths using the DPT rig, and 2) the need to collect soil gas samples above the water table after a recent heavy rain event.
- Monitoring well location MW219 was shifted to the south away from an armory, utilities, and a septic tank located at the U.S. Marine Corps (USMC) temporary offices.
- Soil gas sample identifiers were renamed to correspond with the co-located monitoring well identifications.
- Existing monitoring well MW02 could not be located. A new monitoring well (MW02A) was installed in the surveyed location of the original well. MW02A was screened at the same depth interval as the original monitoring well.
- In order to conduct a more comprehensive evaluation of the Building 234 sump, the investigation procedure was updated. Instead of advancing a single soil boring (SB203) as prescribed in the Work Plan Addendum, two exploratory borings were advanced with hand augers followed by the

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advancement of three additional DPT exploratory borings. This approach provided a more comprehensive coverage and helped to determine if a concrete bottom was present along the entire length of the sump. For the purposes of site boring counts, this location will be considered SB203.

Of the 26 total borings, 13 were advanced using HSA drilling techniques, 9 were advanced using DPT, and 4 were advanced using hand augers. DPT drilling was conducted with a hydraulically-powered direct-push GeoProbe<sup>TM</sup> drilling rig. Surface and subsurface soil samples were collected using 2-inch diameter Macrocore® samplers with acetate liners. Soil borings were advanced in five foot intervals to the top of bedrock or refusal. HSA drilling was conducted by using a conventional drill rig to advance through subsurface material using a 4.25-inch insider diameter (ID) HSA, and a 2-foot long, 2-inch outside diameter (OD) split-barrel sampler. The split barrel sampler was advanced in 2-foot intervals. Continuous soil samples were collected at select locations, during boring advancement. Hand drilling was conducted by hand turning a stainless steel auger handle until the desired depth was reached. When the target depth was reached the auger was extracted from the borehole and the soil boring was retrieved in roughly 1 ft. intervals.

Once the soil boring was retrieved from the ground the field geologist screened the soil for total VOCs using a photoionization detector (PID). The headspace soil aliquot was collected and the soil description and other observations were recorded on the boring log.

Up to three sample aliquots were collected from each split spoon/sleeve/auger barrel. One aliquot was used for jar headspace screening for total organic vapors, a second aliquot was collected for potential laboratory VOC and/or gasoline range organics (GRO) analysis, and the third aliquot was stored for other possible laboratory analysis.

The physical characteristics of each soil sample were described using the Unified Soil Classification System (USCS) and recorded on boring logs, as displayed in Appendix B. In addition to sample characteristics, other pertinent observations such as depth to water, sample moisture, depth changes in lithology, fill material, staining, and visual contaminants or odors were recorded on the boring logs.

Soil samples were analyzed for a subset of the following analyses dependent on the sample location and the criteria presented in the Work Plan Addendum: VOCs, PAHs, PCBs, metals, and GRO/diesel range organics (DRO). A summary of soil samples collected and selected for laboratory analysis is presented in Table 3-1. General observations such as sample type and number, sampling time, depth interval, and methods are also presented in Table 3-1. Analytical results are discussed in Section 4 of this report.

# 3.1.2 Field Measurements and Observations during Advancement of Soil Borings

This subsection presents a summary and description of the soil boring program completed by Tetra Tech at the five subareas of the Site. Field documentation collected during implementation of this program is provided in Appendix A (field documentation forms) and Appendix B (soil boring and monitoring well construction logs).

### Southern Waterfront Area

Two soil borings, advanced using the HSA drilling technique, were completed in the northern portion of the Southern Waterfront Area, immediately south of former Building 234. Both soil borings (B201 and B202) at this location were advanced to a terminal depth of 18 ft. bgs. One soil sample was collected from each soil boring for laboratory analysis and reporting at the interval below the topsoil layer in order to investigate if any potential PAH or metals contamination is present in the former berm Section 6 of the Southern Waterfront area.

**Boring 201:** Subsurface soil at B201 included sandy silt with gravel (0 to 2 ft. bgs), poorly graded gravel with silt (2 to 4 ft. bgs), silty gravel (4 to 11.6 ft. bgs), silty sand (11.6 to 13 ft. bgs), poorly graded sand with silt and gravel (13 to 14 ft. bgs), and silty gravel with sand (14 to 18 ft. bgs). Jar headspace screening readings were minimal, peaking at 0.6 ppm on the PID at the 2 to 4 ft. bgs interval at B201. A soil sample for laboratory analysis and reporting was collected from the 2 to 4 ft. depth interval.

**Boring 202**: Subsurface soil at B202 included sandy silt with gravel (0 to 10.4 ft. bgs), organic silt (10.4 to 12.3 ft. bgs), and sandy silt with gravel (12.3 to 18 ft. bgs). Although headspace readings were not recorded, due to instrument malfunction, the 2 to 4 ft. bgs was selected for laboratory analyses because this interval was grey in color, indicating the presence of native material below the topsoil layer.

# **Building 234 (Sump 234-4)**

At location SB203, two exploratory soil borings were advanced with hand augers followed by the advancement of three additional DPT exploratory borings. These five borings were advanced along the entire length of Sump 234-4 to determine if a concrete bottom was present and to investigate for potential historic TPH contamination associated with the operations in former Building 234. Borings were advanced to a depth of 3 to 5 ft. bgs. Inspection of the boring confid the presence of a concrete bottom in Sump 234-4 therefore no soil samples were collected. Historic records and these field observations

confirmed that the sumps were filled in with clean fill and/or sand. Photographic evidence of material obtained from the DPT borings documented the presence of fill material in Sump 234-4.

#### Central Shipyard - Building 42 ("hotspot" excavation area and downgradient of sump S42-1)

Two soil borings utilizing the HSA drilling technique were advanced in the Central Shipyard area of the Site to evaluate groundwater quality for potential shallow groundwater contamination associated with two former source areas at this location. Each soil boring at this location was advanced to a terminal depth of 20 ft. bgs. No soil samples were collected from these locations due to the presence of historic soil samples, in accordance with the Work Plan Addendum.

One soil boring (MW218) was advanced north of former Building 42, in the vicinity of TP-25, excavated in 1996 as part of the SASE field investigation. The soil boring was completed as an overburden monitoring well to investigate any potential contamination in the overburden groundwater downgradient of a suspected disposal pit area.

The second soil boring (MW219) was advanced west of former Building 42 and downgradient of former sump S42-1. This soil boring was completed as an overburden monitoring well to investigate any potential contamination in the shallow overburden groundwater from sump discharges from a paint room in former Building 42.

**MW218:** Subsurface soil at this soil boring location included a thin layer of poorly graded sand with silt and gravel (0 to 0.5 ft. bgs), sandy silt (0.5 to 9.25 ft. bgs), silt with gravelly sand (10 to 11.5 ft. bgs), weathered phyllite (12 to 13.4 ft. bgs), silty gravel (14 to 15.6 ft. bgs), poorly graded sand with silt and gravel (16 to 17.6 ft. bgs) and poorly graded gravel with silt and sand (18 to 19.4 ft. bgs). Jar headspace screening at this soil boring ranged from 0.5 to 1.4 ppm on the PID. This soil boring was completed as monitoring well MW218, screened from 10 to 20 ft. bgs in the overburden to target the interval intersecting the water table.

**MW219:** Subsurface soil at this soil boring location included a top layer of sandy silt with gravel (0 to 1.8 ft. bgs), poorly graded gravel with silt and sand (2 to 3 ft. bgs), sandy silt (4 to 7.6 ft. bgs), gravelly silt with sand (8 to 9.5 ft. bgs), silty gravel (14 to 16.2 ft. bgs), and gravelly silt with sand (18 to 19.2 ft. bgs). The maximum jar headspace reading was 1.9 ppm on the PID. This soil boring was completed as monitoring well MW219, screened from 10 to 20 ft. bgs in the overburden to target the interval intersecting the water table.

# PCB Removal Area - Building 6/Test Pit 14 Area

Seven soil borings (SB208 through SB214) were advanced at this Site subarea using DPT drilling techniques. The seven soil borings were advanced north and east of Building 6 to confirm that previous soil excavations removed PCB-contaminated soils. Due to heavy rain, headspace readings were not recorded during soil boring advancement efforts. Soil borings ranged in total depth from 0.5 to 4 ft. bgs. The soil samples collected from this location were submitted for laboratory analysis and reporting of PAH, PCB, metals, and DRO/GRO.

### PCB Removal Area - Building 6/Test Pit 14 Area (Transformer Bank)

Four soil borings (SB215, SB216, SB217, and SB224) were advanced in this area north of Building 6 at the former transformer bank using the hand auger drilling technique. These borings were completed to investigate for potential PCB contamination in the shallow soil (0 - 0.5 ft. bgs) at this area of the Site. The soil samples collected from this location were submitted for PCB laboratory analysis and reporting.

#### Northern Waterfront - Huts 1 and 2

Four borings were completed in the Northern Waterfront area in the vicinity of former Huts 1 and 2, the location of the former vehicle maintenance area. One soil boring north of former Huts 1 and 2 was advanced using a HSA drill rig to investigate for potential soil and groundwater contamination in the vicinity test pits TP-16 and TP-27, excavated in 1996 as part of the SASE investigation. The soil samples collected from this location were submitted for VOC, PAH, metals, and DRO/GRO analysis and groundwater was submitted for VOC, PAH, and metals analyses.

**MW204:** Subsurface soil at this soil boring location included a thin asphalt layer (0 to 0.2 ft. bgs), sand and gravel (2 to 16 ft. bgs), and silt, sand, and gravel (16-18 ft. bgs). Jar headspace PID screening readings peaked at 0.5 ppm. The 0 to 2 ft. bgs and 8 to 10 ft. bgs depth intervals were selected for laboratory analysis and reporting. The 8 to 10 ft. depth interval was chosen because this was the interval directly above the water table. MW204 was screened from 8 to 18 ft. bgs in the overburden to best target the interval intersecting the water table.

Three additional soil borings were advanced north/northeast of former Huts 1 and 2 utilizing the HSA drilling technique. These soil borings were advanced to investigate potential soil contamination in the vicinity of TP-16 (1996 sample location). The soil samples collected from these locations were submitted for VOC, PAH, metals, and DRO/GRO laboratory analysis and reporting.

**Boring 205:** Subsurface soil at this location included silty sand and gravel (0 to 2 ft. bgs), well graded sand and gravel (2 to 4 ft. bgs), poorly graded sand (4 to 8.5 ft. bgs), and silt with sand

and gravel (10 to 14 ft. bgs). Jar headspace PID screening readings peaked at 0.3 ppm. The depth intervals selected for laboratory analysis were from 0 to 2 ft. bgs and 8 to 8.5 ft. bgs. The 8 to 10 ft. interval was chosen because it was inferred to be directly above the water table and consisted of a poorly graded sandy material which would potentially exhibit impacts to environmental media quality from activities associated with the former vehicle maintenance area.

**Boring 206:** Subsurface material at this boring location included a thin asphalt layer (0 to 0.33 ft. bgs), a thin layer of gravel underneath (0.33 to 0.5 ft. bgs), well graded sand with silt (0.5 to 6 ft. bgs), poorly graded sand with gravel (6 to 12 ft. bgs), poorly graded sand with silt and gravel (12 to 13.5 ft. bgs), and silty sand and gravel (13.5 to 14 ft. bgs). All jar headspace PID screening readings were below 1 ppm. The intervals selected for laboratory analysis were from 0 to 2 ft. bgs and 8 to 10 ft. bgs.

**Boring 207:** Subsurface soil at this boring location included a thin silty sand and gravel layer (0 to 1.8 ft. bgs), fine sand with trace silt (22 to 4 ft. bgs), well graded sand (4 to 10 ft. bgs), well graded sand with gravel (10-12 ft. bgs) and sandy gravel (12 to 13.8 ft. bgs). All PID jar headspace screening readings were below 1 ppm. Sample for laboratory analysis and reporting were selected from the 0 to 2 ft. bgs and 10 to 12 ft. bgs intervals.

#### **Northern Waterfront Area**

Six monitoring wells were installed in the Northern Waterfront Area to provide additional groundwater data in areas where VOCs were previously detected in overburden groundwater. Four monitoring wells were located in new portions of the Northern Waterfront area and in one upgradient/background location. Two borings were advanced to replace historic wells MW02 and MW11 that could not be located. In addition, four gas probes were co-located with monitoring wells MW02A, MW03, MW11A, and MW12 for the purposes of collecting samples to evaluate soil gas quality in this area. Groundwater and soil gas samples were submitted for VOC analysis and reporting.

Monitoring wells MW220 and MW221 were installed using the HSA drilling technique downgradient of the former hazardous waste storage area.

**MW220:** Subsurface soil encountered at this location included gravelly silt with sand (0 to 2 ft. bgs), well graded sand with gravel (2 to 4 ft. bgs), poorly graded sand (4 to 10 ft. bgs), poorly graded sand with gravel (10 to 14 ft. bgs), well graded sand with gravel (14 to 17.6 ft. bgs), silt (17.6 to 18.6 ft. bgs), and poorly graded sand (18.6 to 20 ft. bgs). All jar headspace PID

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screening readings were below 1 ppm. MW220 was screened from 5 to 20 ft. bgs in the overburden to target the interval intersecting the water table.

**MW221:** Subsurface material encountered at this location included a thin layer of asphalt pavement (0 to 0.33 ft. bgs), silty sand with gravel (0.33 to 4 ft. bgs), poorly graded sand with gravel (4 to 5 ft. bgs), poorly graded sand (6 to 7 ft. bgs), and silty sand and gravel (8 to 15.3 ft. bgs). All PID jar headspace screening readings were below 1 ppm. MW221 was screened from 3 to 15 ft. bgs in the overburden material to target the interval intersecting the water table.

**MW222:** Monitoring well MW222 was installed in the central portion of the northern waterfront area. Subsurface soil encountered at this location included well graded sand with silt and gravel (0 to 1.5 ft. bgs), well graded sand with gravel (2 to 5.5 ft. bgs), poorly graded sand (6 to 14 ft. bgs), silt with gravelly/sandy matrix (14 to 24.9 ft. bgs). The maximum jar headspace PID screening result was documented at 3.7 ppm at the 0 to 2 ft. bgs. MW222 was screened from 4 to 14 ft. bgs in the overburden to target the interval intersecting the water table.

**MW02A:** Monitoring well MW02A was installed to the original well which could not be located. Subsurface material encountered at this location included a thin asphalt layer (0 to 0.5 ft. bgs), silty gravel with sand (0.5 to 1.0 ft. bgs), silty sand (1.0 to 25.6 ft. bgs), and poorly graded gravel with silt and sand (25.6 to 26 ft. bgs). Because this was a replacement well, headspace readings were not recorded. MW02A was screened from 16 to 26 ft. bgs to mimic the screen location of the original monitoring well (MW02). A soil gas probe was also installed at this location.

**MW11A**: Monitoring well MW11Awas installed at the northern waterfront area south of pier 2 (location of a historic monitoring well) using the DPT drilling technique. This soil boring was completed as a temporary monitoring well (MW11A) because the original monitoring well (MW11) could not be located. In addition, the location is an active construction area where a permanent monitoring well would have likely been destroyed. The original well was installed using the HSA drilling technique and screened from 19 to 29 ft. bgs. This replacement well was screened from 5 to 10 ft. bgs due to depth limitations using the DPT rig and the need to collected soil gas samples above the higher water table.

**MW223:** Monitoring well MW223 was installed in an upgradient/background location at the former fleet parking area. This well was completed as a bedrock well because groundwater was not encountered in the overburden. Subsurface soil encountered at this location included gravelly sand (0 to 2 ft. bgs), silty gravel (2-4 ft. bgs), well graded sand with silt and gravel (4 to 4.3 ft.

bgs.), silt with gravel (4.3 to 6 ft. bgs), sandy silt with gravel (6 to 25.8 ft. bgs), shale or weathered phyllite (25.8 to 28 ft. bgs,), and bedrock (28 to 47 ft. bgs). Jar headspace readings were not recorded because no soil samples were collected from this location. MW223 was screened from 41 to 51 ft. bgs in bedrock to target the interval intersecting the bedrock water table.

#### 3.2 GROUNDWATER SAMPLING

Groundwater sampling was conducted to identify contaminants present, if any, their impacts on groundwater quality, and to provide information on the groundwater elevations and flow dynamics across the Site. This subsection provides an overview of the groundwater sampling efforts, including summaries of the monitoring well installation methods, well construction details, groundwater sampling methodology, and field measurements and observations associated with the groundwater investigation conducted at the Site. Locations of groundwater monitoring wells are presented on Figure 3-1. Soil boring logs, well boring logs, and groundwater monitoring well construction logs are presented in Appendix B. A detailed evaluation of groundwater sample analytical data is presented in Section 4.0.

Nine additional monitoring wells and three existing monitoring wells were sampled across the Site as part of the SASE Addendum field efforts completed by Tetra Tech. Monitoring well locations were chosen to further investigate areas of suspected groundwater quality impacts based upon historical information. As previously described in Section 3.1.2, one monitoring well was screened in bedrock, while the remaining monitoring wells were screened across the overburden water table interface. At each monitoring well location, a boring was advanced down to refusal, or to a targeted depth (i.e. locations MW11A and MW02A). Soil samples were only collected at one location (MW204), in accordance with the Work Plan Addendum.

The monitoring wells were constructed of 2-inch ID, flush-threaded, Schedule 40 polyvinyl chloride (PVC) screen and riser. 10-slot (0.010 in) well screens were installed in lengths ranging from 5 to 15 ft. The well annulus was backfilled with No.1 silica (quartz) sand filter-pack to at least 1 ft. above the top of the well screen, and a minimum 2 ft. thick seal consisting of bentonite chips was placed above the sand pack. Cement/bentonite grout was placed in the well annulus from the top of the bentonite seal to the ground surface. A concrete surface seal was placed at each well surrounding the casing, excluding monitoring well MW-11A (temporary well). Table 3-3 presents a summary of monitoring wells that were installed and provides details on the construction of the wells installed as a part of this SASE Addendum.

# 3.2.1 <u>Monitoring Well Installation</u>

A total of nine monitoring wells (eight overburden and one bedrock) were installed during the February-March 2011 field event. One of the eight overburden monitoring wells (MW11A) was completed as a temporary well using DPT drilling techniques and the remaining seven overburden wells (MW02A, MW218, MW219, MW204, MW220, MW221, and MW222) were completed as permanent wells installed using HSA drilling methods. With the exception of MW02A, the well depths, screen placement, and screen lengths of the permanent overburden wells were chosen based upon jar headspace PID screening and field observations obtained from split-spoon soil sampling. The well depth, screen placement, and screen length for replacement well MW02A was identical to that of the well being replaced (MW02).

The one bedrock monitoring well (MW223) was completed as a permanent well using the HSA drilling methods. This well served to provide upgradient data for the Northern Waterfront monitoring wells. The bedrock monitoring well screen was set at 41 to 51 ft. bgs.

# 3.2.2 Groundwater Monitoring Well Development and Water Level Measurements

Nine new and three existing monitoring wells were developed during the February-March 2011 sampling event. For newly installed monitoring wells, development was conducted no sooner than three days after well installation. Each well was developed by removing water with 1/2-in ID, 5/8-in OD low density polyethylene (LDPE) tubing fitted with a check valve and driven by a Waterra pump. During well development, water quality parameters (stabilization criteria) were monitored, including: pH, conductivity, temperature, and turbidity. The objective of the well development program was to establish connectivity with the aquifer by removing fine-grained sediments from the soil formation within the vicinity of the well screen, pumping until the water quality parameters stabilized, optimally achieving a turbidity of less than 10 Nephelometric Turbidity Units (NTUs).

None of the monitoring wells achieved these optimum stabilization criteria because the silty nature of the soil in the area created high turbidity conditions in the wells. Final turbidity levels in one monitoring well (MW-218 at 12.3 NTUs) approached the 10 NTU criteria, but the remaining wells were well above the turbidity stabilization goal (85.1 to 1456 NTUs). Turbidity readings for two of the eleven monitoring wells (MW-204 and MW-222) were either not measured or measured inconsistently due to an equipment malfunction. A summary of the well development data, including the final stabilization criteria readings, is provided in Table 3-4. Well development logs are provided as part of the field documentation forms in Appendix A.

During groundwater sampling efforts, depths to groundwater (recorded as static water levels on the low flow log sheet) ranged from approximately 5.09 (MW222) to 14.91 (MW218) ft. below top of the PVC riser pipes across the site. The depth to water in temporary monitoring well MW11A (6.11 ft. bgs) was measured from the ground surface. The top of the water column was gauged in each monitoring well with an oil-water interface probe to check for the potential presence of light non-aqueous phase liquids (LNAPLs). LNAPL was not detected in any of the monitoring wells gauged during this investigation.

Survey activities to document elevation and horizontal location data for each of the newly installed groundwater monitoring wells, soil borings, and soil gas sample collection points were conducted on April 2011. The horizontal control datum was North American Datum (NAD) 1983 and the vertical control datum was National Geodetic Vertical Datum (NGVD) 1929. The elevations of each well's outer protective casing and the top of the PVC inner riser pipe were surveyed to the nearest one-hundredth of a foot (0.01 ft.). The ground adjacent to each well and the soil boring locations were surveyed to the nearest one-tenth of a foot (0.1 ft.). The well coordinates and elevations are provided in Table 3-3.

## 3.2.3 Groundwater Sample Collection

Groundwater sampling was conducted from February 24, 2011 through March 17, 2011. Groundwater samples for laboratory analysis were collected from nine newly-installed monitoring wells and from three existing monitoring wells. All monitoring wells were sampled using low stress (low-flow) purging and sampling procedures according to the GW-001 USEPA Region I low-flow SOP, as presented in Appendix D.

Dedicated tubing was used in each monitoring well to minimize potential cross-contamination between monitoring wells during well purging efforts. Water level, drawdown, and flow rate were recorded on low-flow groundwater sample log sheets. Groundwater was pumped through a flow-through cell which allowed measurements of pH, specific conductance, temperature, dissolved oxygen (DO) oxidation-reduction potential (ORP), and salinity. Turbidity was measured separately with a nephelometer. These field indicator parameters were all recorded on low-flow groundwater sample log sheets, provided as part of the field documentation forms in Appendix A. No PID positive detections, odors, or sheens were noted during the purging and sampling event, or during previous well development activities.

Approximately six to thirty-three liters of groundwater were purged from each monitoring well prior to stabilization of sampling criteria, as documented in Table 3-5. Final turbidity values of less than 5 NTUs were recorded in 6 of the 12 monitoring wells sampled. Final turbidity values in the remaining wells

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ranged from 7.36 NTUs (MW11A) to 50 NTUs (MW223). Drawdown levels during the final three readings (stabilization time) did not exceed 0.3 ft. in any of the monitoring wells.

Groundwater samples collected from all monitoring wells were analyzed for VOCs, and samples collected from selected monitoring wells (MW08, MW204, MW218, and MW219) were also analyzed for PAHs and for total and dissolved Target Analyte List (TAL) metals. The associated field forms are presented in Appendix A.

#### 3.3 SOIL-GAS SAMPLE COLLECTION

Soil-gas sampling was conducted on February 24 and March 3, 2011. Soil-gas samples were collected from four locations (co-located with monitoring wells) as depicted on Figure 3-1.

Prior to sampling, vapor probes were advanced using a DPT rig. After installation, the vapor probes were sealed from the atmosphere using modeling clay and then leak tested to verify the seal integrity. Using a vacuum pump calibrated to a flow rate of 200 milliliters per minute (ml/min), three probe volumes (volume of the soil vapor sampling probe and attached tubing) of soil gas was purged into a 3 liter (L) polyethylene (PE) bag. A PID was used to screen the collected soil vapor for total VOCs and a helium detector was again used to evaluate the bag seal. Following a successful leak test, a 1 hour purge was allowed before attaching and filling a clean 6 L Summa canister for submittal to the laboratory for analysis and reporting.

Prior to moving to a new sample location, the probe rods were removed from the subsurface and scrubbed with a detergent solution before being rinsed with potable and then distilled water. Dedicated tubing was used at each soil gas sampling station to minimize the potential for cross-contamination. All field measurements and notable observations made during soil gas sampling were recorded on sample log sheets, provided as part of the field documentation forms in Appendix A. A summary of the field measurements collected during soil gas sampling program is provided in Table 3-6.

Four soil-gas (SG) samples (SG-MW02A, SG-MW03, SG-MW11A, and SG-MW12) were collected and submitted for VOC laboratory analysis via USEPA Method TO-15. All samples were collected below a depth greater than 5 ft. bgs (deep SG), except SG-MW11A which was collected from 2 to 3 ft. bgs, a shallow SG interval.

Soil profile observations were recorded during the installation of MW02, MW03, MW11, and MW12 in 1996. The uppermost surficial materials in the Northern Waterfront area were described primarily as gravelly sands, silty sands, and fine to medium poorly graded sands with varying proportions of silt,

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gravel, and traces of shell fragments in some soils. These sands continue at the deepest borings to approximate depths between 10 ft. bgs at (MW03) to 24 ft. bgs (at MW02), and are underlain by a tight and dense, silty, gravelly, sand with trace clay (probable till). The probable till, encountered above weathered bedrock, varied between approximately 8 ft thick at MW03 to approximately 12 ft thick at MW04.

During the advancement of vapor probes at location SG-02A, the encountered material included a thin asphalt layer (0 to 0.5 ft. bgs), silty gravel with sand (0.5 to 1.0 ft. bgs), silty sand (1.0 to 25.6 ft. bgs), and poorly graded gravel with silt and sand (25.6 to 26 ft. bgs).

### 4.0 ANALYTICAL RESULTS

This section presents a discussion of the analytical results from environmental media samples that were collected and analyzed in 2011 as part of this SASE Addendum investigation. Analytical results for contaminants present at concentrations greater than the laboratory instruments detection limits are summarized in Tables 4-1 through 4-4. The complete analytical results can be found in Appendix E.

#### 4.1 SAMPLE ANALYSIS AND DATA VALIDATION

Soil, groundwater, and soil gas samples were collected and analyzed in accordance with the SASE Work Plan Addendum (Tetra Tech, 2011). Laboratory analysis was conducted under USEPA SW-846 for VOCs was by Method 8260B, PAHs by Method 8270C, PCBs by Method 8082, DRO and GRO by Method 8015B, and metals by Methods 6010C, 7470A and 7471A. Soil-gas samples were analyzed for VOCs by USEPA TO-15 Air Compendium Method.

Petroleum hydrocarbons (extractable) were analyzed using a gas chromatography/flame ionization detector (GC/FID) method (USEPA Method 8015B) modified for quantification of extractable petroleum hydrocarbons in the C-8 to C-40 range. Results from this analysis were reported as DRO. In addition, GRO analysis provided quantification of petroleum hydrocarbons in the C-6 to C-10 range. Both DRO and GRO results are discussed in the text of this section as petroleum hydrocarbons.

All the laboratory data results were validated by Tetra Tech chemists according to established USEPA Region I data validation guidelines. A Tier II level data validation was performed for the VOC, SVOC, PAH, pesticide, PCB, GRO, DRO, and metals results.

In general, data were found to be acceptable for use in this SASE and for evaluation of risk under Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and USEPA protocols. Qualifications on the reported data are documented in the data validation memoranda for each data package provided by the analytical laboratory. Data validation memoranda are presented in Appendix E of this report.

The discussion in this section contains summaries of analytical results along with comparisons of detected contaminant levels to comparison criteria as described in Section 4.1.1 of the On-Shore Derecktor Shipyard Work Plan Addendum (Tetra Tech, 2011).

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#### 4.2 SUMMARY OF ANALYTICAL RESULTS

Data discussions in this section focus on the maximum concentrations of chemical contamination detected. Concentrations of chemical contamination are presented in summary Tables 4-1 through 4-4, for each environmental media that was sampled.

Analytical results for field duplicate samples were averaged with the original sample results. Sample stations where this calculation was performed are identified with the suffix "-AVG". For instances where two positive or non-detected results were reported, the results were added together and divided by two. For instances where one positive result and one non-detect result were reported, the positive result was added to one-half the undetected result and then divided by two. If the non-detect result was elevated due to dilutions, the positive result was used for the average.

Contaminant-specific concentrations were compared to project action levels (PALs) established in the Work Plan Addendum. PALs for soil consisted of the lowest of the USEPA Regional Screening Levels (RSLs) (2011) and the RIDEM Residential Soil DEC. PALs for groundwater consisted of the lowest of USEPA maximum contaminant levels (MCL) and the RIDEM GA groundwater aquifer criteria. PALs for soil gas were derived from USEPA residential air RSLs adjusted by an attenuation factor of 0.01 for deep soil gas samples. In addition, RSLs adjusted by an attenuation factor of 0.1 for shallow soil gas were presented for comparison purposes.

The NAVSTA Newport Basewide Background Study (Tetra Tech, 2008) was used to establish background concentrations for inorganics. The ProUCL software program was used to calculate the 95% Upper Predictive Limit (UPL) to be used as a background threshold value (BTV) for Site 19 – On-Shore Derecktor Shipyard. 95% UPLs were calculated from the base background dataset for all surface and subsurface soil types. The soil types were combined because the soil type at the Site is classified as urban fill and is likely a combination of different soil types from other portions of NAVSTA Newport. The background analysis is included in Appendix G-1.

## 4.2.1 Southern Waterfront Area

## Subsurface Soil

Two borings, SB201 and SB202, were advanced in former berm Section 6 of the Southern Waterfront area to a depth of 2 to 4 ft bgs. Subsurface soil samples were collected from below the topsoil layer and analyzed for PAHs and metals to confirm no residual contamination is present. Analytical results indicated no PAHs present above the laboratory instruments method detection limits. The following metals were detected above USEPA RSLs in both samples: aluminum, arsenic, chromium, cobalt, iron,

and manganese. All concentrations were above the 95% UPL background concentrations, except for chromium in SB202, and manganese in both samples. Beryllium was also detected above the Rhode Island (RI) Residential DEC in SB201, but not above the 95% UPL background concentration. Chemicals of concern (COCs) in the stockpiles created during the removal actions conducted at the southern waterfront included PAHs, arsenic, and lead. In the 2011 samples, lead was detected at a maximum of 13.6 J milligrams per kilogram (mg/kg) in SB202 and arsenic at a maximum of 26.3 mg/kg in SB202. Concentrations of select PAHs and metals are presented in Figure 4-1. Table 4-1 presents a summary of the results for analytes that were present at levels greater than detection limits. Complete analytical results can be found in Appendix E.

## 4.2.2 <u>Building 234 Area</u>

## Sump 234-4 Exploratory Boring - Subsurface Soil

Exploratory borings were advanced to confirm the presence of a concrete bottom in Sump 234-4. Two hand auger borings indicated that an intact concrete bottom was present in the vicinity of the boring. In an effort to further delineate the extent of the concrete flooring three additional DPT borings were advanced to confirm the presence of a concrete bottom. No samples were submitted for laboratory analysis at this location since each exploratory boring confirmed the presence of fill material and a concrete bottom.

#### MW-08 - Groundwater

North of former Building 234 an existing overburden monitoring well (MW08) was sampled to investigate any potential impacts to groundwater quality from the former location of USTs and a machine shop to the shallow overburden aquifer. One overburden groundwater sample was collected from MW08 and analyzed for VOCs, PAHs, and metals (total and dissolved).

Five chlorinated VOCs (1,1-dichloroethene, cis-1,2-dichloroethene, TCE, trichlorofluoromethane, and vinyl chloride) were detected during the March 2011 groundwater sample round at concentrations below groundwater PALs, as illustrated in Figure 4-2. No PAHs were detected above the laboratory's instrument method detection limits. A total of 14 metals were detected in MW08 total and dissolved sample fractions at concentrations below criteria. Table 4-2 presents a summary of the results for analytes that were present at levels greater than detection limits in groundwater samples.

# 4.2.3 Central Shipyard - Building 42 ("Hotspot" Excavation Area and Downgradient of Sump S42-1)

## Monitoring Wells MW-218 and MW-219

Shallow overburden groundwater at MW-218, was collected to investigate potential contamination associated with a past TPH source investigation. Former location TP-25 associated with the source investigation had elevated FID readings and an observable sheen at the water table. The groundwater samples collected during the February - March 2011 sample round were analyzed for VOC, PAHs, and metals. No VOCs or PAHs were observed above the laboratory instruments method detection limits in groundwater. Both total and dissolved arsenic were present at concentrations 2.8 and 2.9 times greater than the MCL, respectively. Table 4-2 presents a summary of the results for analytes that were present at levels greater than the laboratory instruments method detection limits in groundwater samples.

MW-219 was installed to investigate potential overburden groundwater contamination downgradient of former paint/solvent sump S42-1. Groundwater samples were collected for VOCs, PAHs, and metals. Acetone was the only VOC detected in the groundwater sample. It was present in the duplicate sample but was not found above the laboratory instruments method detection limits in the original sample. No PAHS were detected above the laboratory instruments method detection limits. A total of 14 total metals and 13 dissolved metals were detected in groundwater. Concentrations of total and dissolved arsenic were detected at levels more than 7 times greater than the MCL (10 micrograms per liter [µg/L]). There were no other exceedences of metals criteria in groundwater. Figure 4-2 presents concentrations of selected analytes (VOCs and arsenic) for this location.

## 4.2.4 PCB Removal Area - Building 6/Test Pit 14/Area

#### Surface Soil

Surface soil samples were collected from two borings, SB208 and SB209, advanced in the vicinity of the Building 6/TP-14 PCB removal area and submitted for DRO/GRO, PAHs, PCBs, and metals analyses.

DRO was detected below the RIDEM DEC with concentrations ranging from 35.5 mg/kg (SB208-D) to 366 mg/kg (SB209). GRO was also detected below RIDEM DEC in SB208 (2.83 mg/kg) and its duplicate sample SB208-D (4.82 J mg/kg).

Aroclor 1260 was detected with concentrations ranging from 24.2 J micrograms per kilogram ( $\mu$ g/kg) (SB208-D) to 416 J  $\mu$ g/kg (SB209). The concentration detected in SB209 exceeded the USEPA criteria of 220  $\mu$ g/kg.

Seventeen PAHs were detected, with eight PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) exceeding criteria. Three exceedences of PAH criteria were detected in SB208, one exceedence of benzo(a)pryene criteria was in SB208-D, and eight exceedances of PAH criteria were in SB209.

Twenty metals were detected in surface soil, with seven (aluminum, arsenic, beryllium, chromium, cobalt, iron, and manganese) exceeding USEPA RSL criteria. The maximum concentrations of the seven exceedances occurred in either SB208 or its duplicate. Background concentrations were not exceeded for aluminum arsenic, beryllium, chromium, cobalt, iron, and manganese in SB209; and chromium in both locations. Soil concentrations of selected PAHs, PCB, and, metals (arsenic and chromium) are presented in Figure 4-3.

#### Subsurface Soil

Five subsurface soil samples, SB210 through SB214, were collected laboratory analyses and reporting of DRO/GRO, PAHs, PCBs, and metals in the vicinity of the Building 6/TP-14 PCB removal area.

DRO was detected below criteria with concentrations ranging from 17.8 mg/kg (SB212) to 48.2 mg/kg (SB211). GRO was not present above the laboratory instruments method detection limits. PCBs were not detected above the laboratory instruments method detection limits in any sample.

Seventeen PAHs were detected in subsurface soil, with four PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene) exceeding criteria. Exceedances of each of the four PAH criteria were detected in SB214, while the only exceedance recorded in the remaining three locations was for benzo(a)pyrene.

Twenty-one metals were detected in subsurface soil, with five of those metals (arsenic, beryllium, chromium, iron, and manganese) exceeding criteria in all five samples. Aluminum and cobalt exceeded their respective standards in four samples. Background concentrations were exceeded for arsenic, chromium, and manganese in SB214; and beryllium in SB212 and SB214. Soil concentrations of selected PAHs, PCBs, and metals are presented in Figure 4-3.

## 4.2.5 PCB Removal Area - Building 6/Test Pit 14/Area (Transformer Bank)

## Surface Soil

Four soil borings (SB215, SB216, SB217, and SB224) were advanced in the vicinity of the transformer bank located in the Building 6/TP-14 PCB removal area. Surface soil samples collected from the borings

were analyzed for PCBs. Analytical results indicated that no PCBs were present above the laboratory instruments method detection levels.

## 4.2.6 Northern Waterfront - Huts 1 and 2

Four borings, SB204 through SB207 were advanced in the vicinity of Huts 1 and 2 to investigate potential releases associated with a former vehicle maintenance area. Surface and subsurface soil samples were collected and analyzed for VOCs, DRO/GRO, PAHs, and TAL metals. Boring SB204 was completed as monitoring well MW204. The groundwater sample collected from this location was analyzed for VOCs, PAHs, and TAL metals (total and dissolved).

#### Surface Soil

The following VOCs were detected in surface soil: 2-butanone, 2-hexanone, acetone, and carbon disulfide. Acetone was detected in four of the five samples in which it was analyzed, while the remaining VOCs were only detected once in surface soil. Each of the four VOCs detected in surface soil were below criteria.

DRO was detected in three of the five samples collected with concentrations ranging from 12.8 mg/kg (SB204-D) to 31.6 mg/kg (SB207). Detected DRO concentrations were at least an order of magnitude less than the soil DEC. No GRO was detected above the laboratory instruments method detection limits in the surface soil.

Seventeen PAHs were detected in surface soil, with four PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene) exceeding RSLs. Exceedances of PAH criteria were recorded in only two of the four samples (SB205 and SB207). Four PAHs were detected above criteria in SB205 (benzo(a)anthracene [232 J  $\mu$ g/kg], benzo(a)pyrene [165  $\mu$ g/kg], benzo(b)fluoranthene [263  $\mu$ g/kg], and dibenzo(a,h)anthracene [124  $\mu$ g/kg]) and only one PAH was detected above criteria in SB207 (benzo(a)pyrene 29.6 j  $\mu$ g/kg). No PAHs were detected in SB204-D.

Nineteen metals were detected in surface soil, with seven of those metals (aluminum, arsenic, beryllium, chromium, cobalt, iron, and manganese) exceeding criteria. Arsenic, chromium, cobalt, and iron, exceeded their respective criteria in each of the sample locations. Beryllium exceeded criteria in two sample locations (SB205 and SB207), and aluminum and manganese exceeded criteria in one location (SB205). Background concentrations were only exceeded for beryllium, cobalt, and iron in SB205. Concentrations of selected PAHs and metals are presented in Figure 4-1.

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#### Subsurface Soil

Two VOCs, carbon disulfide and m+p xylenes were detected once in SB204 (2.8 J  $\mu$ g/kg) and SB205 (2.6 J  $\mu$ g/kg), respectively. The concentration of carbon disulfide was more than four orders of magnitude less than the regulatory criteria. There was no applicable standard for comparison to m+p xylene.

DRO was detected in one of the four subsurface soil sample collected (SB204 at 7.49 mg/kg) at a concentration two orders of magnitude less than the RIDEM DEC. No GRO was detected above the laboratory instruments method detection limits in the subsurface soil.

Sixteen PAHs were detected in subsurface soil, with two PAHs (benzo(a)pyrene at 23.3 μg/kg and dibenzo(a,h)anthracene at 23.3 μg/kg) exceeding criteria in sample SB205. Both exceedances were recorded in SB205. PAHs were not detected in SB204 or SB206.

Eighteen metals were detected in subsurface soil, with four metals (arsenic, chromium, cobalt, and iron) exceeding criteria. Maximum concentrations of arsenic (9.78 mg/kg), cobalt (5.85 mg/kg), and iron (20,900 mg/kg) were found in SB207. The maximum concentration of chromium was found in SB205 (9.49 mg/kg). None of the detected concentrations exceeded background concentrations. Concentrations of selected PAHs and metals are presented in Figure 4-1.

#### Groundwater

Analytical results indicated the presence of one VOC, TCE (3.16 µg/l) in groundwater monitoring well MW204. There were no exceedances of VOC USEPA MCL criteria in groundwater. There were no PAHs present above detection limits. A total of 11 total and dissolved metals were detected in groundwater with no exceedances of criteria. Concentrations of select VOCs are presented in Figure 4-2.

#### 4.2.7 Northern Waterfront

## Groundwater

Eight groundwater monitoring wells were sampled for VOCs in the Northern Waterfront Area. One monitoring well (MW02A) was installed west of former oil discharge area to investigate potential groundwater contamination in the vicinity of areas of former oil discharges. Three monitoring wells (MW03, MW220, and MW221) were installed to investigate impacts of the hazardous waste storage area to groundwater quality in the area. Two additional monitoring wells (MW11 and MW12) were sampled to assess impacts of former storage areas and other disposal on deep overburden groundwater. One monitoring well (MW222) was sampled to investigate potential groundwater contamination in the center of the northern waterfront area, and one monitoring well (MW223) was installed to provide an upgradient groundwater data point. One duplicate sample (MW11A-D) was collected from MW11.

Five chlorinated VOCs (cis-1,2-dichloroethene, tetrachloroethene, trans-1,2-dichloroethene, TCE, and vinyl chloride) were detected in northern waterfront groundwater samples above the laboratory instruments method detection limits during the February/March 2011 groundwater sample round. TCE was the only VOC to exceed the PAL (5  $\mu$ g/L). TCE exceeded criteria in five of the 8 monitoring wells in which it was sampled with concentrations ranging from 4.97  $\mu$ g/L (MW11A-D) to 12.2  $\mu$ g/L (MW221).

At least one VOC was present above detection limits in each of the northern waterfront area wells, with the exception of MW223, the northern waterfront area background well. Concentrations of select VOCs are presented in Figure 4-5. Table 4-3 presents a summary of the results for analytes that were present at levels greater than detection limits in groundwater samples. A full list of results for all parameters that were analyzed for can be found in Appendix C.

## Soil Gas

Three deep soil gas stations (SG-MW02A, SG-MW03, and SG-MW12) and one shallow soil gas station (SG-MW11A) were sampled in the Northern Waterfront Area during the February/March 2011 soil gas sample round. Soil gas sample stations were collocated with the following northern waterfront area monitoring wells: MW2A, MW03, MW11A, and MW12. One duplicate sample (SG-MW03-D) was collected from SG-MW03. Soil gas samples were analyzed for VOCs as described in Section 3.3.

Thirty-three VOCs were detected in the Northern Waterfront Area. At the deep soil gas stations, no VOCs were detected above USEPA deep soil gas criteria adjusted by the 0.01 attenuation factor. At the shallow soil gas station, SG-MW11A, five VOCs (1,3-butadiene, acrylonitrile, benzene, tetrachloroethene, and TCE) were present above shallow soil gas criteria adjusted by the 0.1 attenuation factor. Select concentrations of VOCs are presented in Figure 4-6. Table 4-4 presents a summary of the results for analytes that were present at levels greater than detection limits in soil gas samples. A full list of results for all parameters that were analyzed for can be found in Appendix C.

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## 5.0 HUMAN HEALTH RISK ASSESSMENT

This section presents the HHRA for the Site and is an update of the HHRA presented in the SASE Report (B&RE, June 1997). The HHRA was updated to incorporate changes in the risk assessment methodology since the original HHRA was prepared and to include additional data that has been collected at the Site since that time. The objective of the HHRA is to determine whether exposure to chemicals in the study area pose a potential unacceptable risk to potential human receptors. The potential risks to human receptors are estimated based on the assumption that no actions are taken to control contaminant releases.

The following current guidance and reports published by the Navy, the USEPA, and the State of Rhode Island were considered in the preparation of this document:

- Conducting Human Health Risk Assessments under the Environmental Restoration Program (Navy, February 2001).
- Navy Policy on the Use of Background Chemical Levels (Navy, January 2004).
- U.S. Navy Human Health Risk Assessment Guidance (Navy, December 2008)
- Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (RIDEM, 2011).
- Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part A) (USEPA, December 1989).
- Soil Screening Guidance: Technical Background Document (USEPA, May 1996).
- Exposure Factors Handbook (USEPA, August 1997).
- Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (USEPA, December 2002).
- Guidance for Characterizing Background and Chemical Concentrations in Soil for CERCLA Sites (USEPA, December 2002).
- Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) (USEPA, July 2004).
- Guidelines for Carcinogen Risk Assessment (USEPA, March 2005).
- Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, March 2005).
- Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment) (USEPA, January 2009).

The HHRA is structured and reported according to the guidelines of the Risk Assessment Guidance for Superfund (RAGS), Human Health Evaluation Manual, Part D: Standardized Planning, Reporting, and Review of Superfund Risk Assessments (RAGS Part D) (USEPA, December 2001). The assessment follows the methodology used for the HHRAs for Site 8 (Tetra Tech, January 2010) and Tank Farm 4 and 5 (Tetra Tech, January 2011).

This HHRA consists of five components: data evaluation, exposure assessment, toxicity assessment, risk characterization, and uncertainty analysis. Sections 5.1 through 5.6 contain detailed discussions of the six components of the HHRA.

Three major aspects of chemical contamination and environmental fate and transport must be considered to evaluate potential risks: (1) contaminants with toxic characteristics must be found in environmental media and must be released by either natural processes or by human action; (2) potential exposure points must exist; and (3) human receptors must be present at the point of exposure. Risk is a function of both toxicity and exposure. If any one of these factors is absent for a site, the exposure pathway is incomplete, and no potential risks are considered to exist for human receptors.

#### 5.1 DATA EVALUATION

Data evaluation, the first component of a baseline HHRA, is a medium-specific task involving the compilation and evaluation of analytical data. The second step (and the main objective) of the data evaluation is to develop a medium-specific list of chemicals of potential concern (COPCs) that will be used to quantitatively and/or qualitatively determine potential human health risks for site media. COPCs are selected primarily based on a risk-based screen (i.e., a comparison of site contaminant concentrations to conservative risk-based screening values) and a background screen (i.e., a comparison of site concentrations to background concentrations).

## 5.1.1 <u>Data Usability</u>

Soil and groundwater samples from the SASE Report (B&RE, January 1997) and soil, groundwater, and soil gas samples from the 2011 field investigation were used in this HHRA. As discussed in Section 2, several non-time critical removal actions (NTCRA) were completed from 1997 to 2007 at the Site. Samples located in the areas where the removal actions occurred have been removed from the database and were not used in this HHRA. Both the historical samples and 2011 samples were used to select COPCs. Surface soil samples at the Site include those from the 0 to 1 ft. bgs, 0.5 to 1.5 ft. bgs, and 0 to 2 ft. bgs.

Only the 2011 groundwater samples were used to quantify risks to groundwater, since this data is representative of the current conditions at the Site. Both total (unfiltered) and dissolved (filtered) groundwater sampling results are presented in the COPC selection tables although only the total results were used to quantify risks.

Field measurements and data regarded as unreliable (e.g., qualified as "R" during the data validation process) were not used in the quantitative HHRA. The maximum of the original and duplicate sample was used in the selection of COPCs. Samples used in this HHRA are listed on the COPC selection tables and in Appendix F.1.

## 5.1.2 <u>Selection of Chemicals of Potential Concern</u>

The selection of COPCs is a quantitative screening process used to limit the number of chemicals and exposure routes quantitatively evaluated in the baseline HHRA to those site-related constituents that dominate overall potential risks. Screening by risk-based concentration (RBC) is used to focus the risk assessment on meaningful chemicals and exposure routes.

In general, a chemical is selected as a COPC and retained for further quantitative risk evaluation if the maximum detection in a sampled medium exceeds the lowest RBC and for inorganics is present above background levels. Chemicals eliminated from further evaluation are assumed to present minimal risks to potential human receptors. Medium-specific tables summarizing the selection of COPCs are included in the risk assessment.

## 5.1.2.1 Derivation of Screening Criteria

The primary criteria used to identify COPCs are based on USEPA RSLs (May 2012) and criteria established by the RIDEM, Office of Waste Management (November 2011) as discussed in the Work Plan Addendum 1 (February, 2011). The RIDEM criteria are being used in this HHRA because they were used in the previous HHRA (B&RE, June 1997). The RSLs were developed and are maintained through a cooperative agreement between Oak Ridge National Laboratory (ORNL) and USEPA's Office of Superfund, and are considered to be USEPA screening criteria. The RSLs are based on exposure pathways for which generally accepted methods, models, and assumptions have been developed (i.e., ingestion, dermal contact, and inhalation) for specific land-use conditions and do not consider impact to groundwater or ecological receptors. The screening concentrations based on the RSLs correspond to a systemic hazard quotient (HQ) of 0.1 for non-carcinogens or an incremental lifetime cancer risk (ILCR) of 1x10<sup>-6</sup> for carcinogens. The RSLs for non-carcinogens are based on an HQ of 1, whereas the screening

concentrations used in the selection of COPCs were based on an HQ of 0.1 to account for the potential cumulative effects of several chemicals affecting the same target organ or producing the same adverse non-carcinogenic effect. The RIDEM criteria include residential direct contact exposure criteria, leachability criteria (classification GA), and GA groundwater objectives.

The COPC screening levels used for each medium in the risk assessment are discussed below.

## **Screening Levels for Soil**

Screening levels based on the following criteria were used to select COPCs for surface and subsurface soil:

- RSLs for residential soil (USEPA, May 2012)
- RIDEM DECs for residential soil (November 2011)

Maximum chemical concentrations in soil were also compared to USEPA risk-based soil screening levels (SSLs) for groundwater protection and to RIDEM GA leachability criteria that were designed to be protective of groundwater at most sites. Existing groundwater data was also used to determine if chemicals are migrating from soil and adversely impacting groundwater. The USEPA SSLs are based on a dilution attenuation factor (DAF) of 1. The SSLs for migration from soil to groundwater and the RIDEM leachability criteria were not used for the selection of COPCs for direct contact exposure; however, they do allow qualitative evaluation of the potential for chemical migration from soil to groundwater. Chemicals with concentrations exceeding the SSLs/RIDEM leachability criteria may potentially migrate from the soil to groundwater in sufficient quantities to pose groundwater quality problems.

The risk-based screening levels used in the COPC selection for soil are presented in Table 5-1.

#### **Screening Levels for Groundwater**

Screening levels based on the following criteria were used to select COPCs for groundwater and surface water:

- RSLs for tap water (USEPA, May 2012)
- RIDEM GA groundwater objectives (November 2011)
- USEPA MCLs (April 2012)

 USEPA Groundwater Screening Levels for Evaluating Vapor Intrusion into Indoor Air from Groundwater (May 2012)

Risk-based COPC screening levels for tap water ingestion, which are based on daily residential exposure assumptions, were used to select COPCs for groundwater. In general, the use of tap water screening levels is regarded as a highly conservative approach to COPC selection at the Site because groundwater is not used as a potable water source.

Screening levels from USEPA Vapor Intrusion Screening Level (VISL) Calculator Version 2.0 (USEPA, May 2012) were used for evaluating the vapor intrusion pathway from groundwater to indoor air. The values correspond to a target cancer risk level of  $1 \times 10^{-6}$ , or a hazard index of 0.1 for carcinogens and noncarcinogens, respectively. The vapor intrusion screening criteria assume a subsurface attenuation factor of 0.001 from groundwater concentrations to indoor air concentrations. The vapor intrusion screening criteria were derived to identify chemical concentrations in groundwater that may adversely affect the indoor air quality of a building overlying subsurface VOC contamination.

The risk-based screening levels and health-based standards used in the COPC selection for groundwater are presented in Table 5-2.

#### Screening Levels for Soil Gas

Soil gas screening levels for evaluating vapor intrusion to indoor air were obtained from USEPA VISL Calculator Version 2.0 (USEPA, May 2012). The soil gas criteria are based on the residential air RSLs and an attenuation factor of 0.1. The risk-based screening levels used in the COPC selection for soil gas are presented in Table 5-3.

#### **Essential Nutrients**

Per USEPA guidance (December 1989) "Chemicals that are (1) essential human nutrients, (2) present at low concentrations (i.e., only slightly elevated above natural occurring levels), and (3) toxic at very high does (i.e., much higher than those that could be associated with contact at the site) need not be considered further in the quantitative risk assessment." Examples of such chemicals are magnesium, calcium, potassium, and sodium. Based on historical information available for the Site, no unusual use or disposal of these constituents occurred at the site under investigation. Soil concentrations greater than 1,000,000 mg/kg (i.e., pure mineral intake) would be required before receptor intake would exceed

recommended daily allowance (RDA) and recommended daily intake (RDI) values. A review of currently available analytical data indicates that such concentrations have not been detected in soil at the Site.

#### **Screening Levels for Chromium**

Chromium speciation was not performed on the soil and groundwater samples collected at the site. Therefore, the screening levels for hexavalent chromium were used for the selection of COPCs.

## **Total Petroleum Hydrocarbons**

Petroleum hydrocarbons are not considered to be a CERCLA contaminant. In addition there is no toxicity criteria available to evaluate risks from exposures to petroleum hydrocarbons. Therefore, petroleum hydrocarbons are not evaluated in this HHRA. Petroleum hydrocarbons are discussed in Section 4.2 (Summary of Analytical Results) and in the 1997 SASE Report.

#### **Chemicals without Toxicity Criteria**

Due to the lack of toxicity criteria, USEPA RSLs are not available for some chemicals [e.g., acenaphthylene, benzo(g,h,i)perylene, phenanthrene, alpha- and gamma-chlordane, monobutyltin, and tetrabutyltin]. For COPC screening, acenaphthene was used as a surrogate for acenaphthylene, pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene, chlordane was selected as a surrogate for alpha- and gamma-chlordane, and dibutyltin and tributyltin were used as surrogates for monobutyltin and tetrabutyltin, respectively.

Direct contact chemical screening values were not available for carbazole, di-n-octyl phthalate, and creosote. Consequently these chemicals could not be quantitatively evaluated in this HHRA. In addition, screening criteria for protection of migration from soil to groundwater were not available for carbazole, creosote, dibutyltin, monobutyltin, tributyltin, and tetrabutyltin. Therefore, these chemicals were evaluated qualitatively in this HHRA. The uncertainty associated with the lack of screening levels for these chemicals is discussed in Section 5.5.1 in the Uncertainty Analysis.

## **Background Evaluation**

In accordance with Navy policy (DON, 2004) chemicals present at background concentrations were not retained as COPCs in this HHRA. The NAVSTA Newport Basewide Background Study (Tetra Tech, 2008) was used to establish background concentrations for inorganics. The ProUCL software program was used to calculate the 95% UPL to be used as a BTV for Site 19 – On-Shore Derecktor Shipyard.

95% UPLs were calculated from the base background dataset for all surface and subsurface soil types. The soil types were combined because the soil type at the Site is classified as urban fill and is likely a combination of different soil types from other portions of NAVSTA Newport. The results of background analysis are included in Appendix G-1. The background evaluation was conducted in accordance with the following Navy guidance:

 Guidance for Environmental Background Analysis, Volume I: Soil. Prepared by Battelle Memorial Institute, Earth Tech, Inc., and Newfields for the Naval Facilities Engineering Command, Washington D.C., April 2002.

In the COPC selection process, if the results of the background evaluation indicated that chemical concentrations detected in Site soils did not exceed background concentrations, that chemical was not selected as a COPC and was not carried through the quantitative risk assessment. However, chemicals present at concentrations exceeding risk-based screening criteria but not selected as COPCs on the basis of background evaluations are further discussed in the risk characterization section in Section 5.4.3.13. The results of the background comparison analysis for surface soil and subsurface soil are presented in Appendix G. No background data is available for groundwater; consequently, a background comparison could not be performed for the groundwater medium.

The elimination of chemicals as site-related COPCs on the basis of background follows Navy Policy on the Use of Background Chemical Levels (DON, 2004). This document also presents the Navy's interpretation of the USEPA guidance provided in the document titled Role of Background in the CERCLA Cleanup Program (USEPA, 2002), and details the methodology to be used in evaluating background under the Navy's Environmental Restoration and Base Realignment and Closure (BRAC) programs. Navy policy has been accepted by the USEPA as not contradicting the USEPA guidance (USEPA, 2002). Navy policy applies to both the screening-level and baseline risk assessments and requires the following:

- 1. A clear and concise understanding of chemicals released from a site thus ensuring the Navy is focusing on remediating the release.
- 2. The use of background data in the screening-level risk assessment.
  - The comparison of site chemical levels to risk-based screening criteria.
  - b. The comparison of site chemical levels to background concentrations.
  - c. The identification of site-related COPCs based on screening criteria comparisons and background comparisons. Site-related COPCs are those chemicals with concentrations

exceeding risk-based screening criteria and background concentrations. To the extent possible, site-related COPCs are further evaluated quantitatively in the baseline risk assessment. (Non-site-related COPCs are further discussed in the risk characterization sections of the baseline risk assessment.)

- 3. The consideration of background in the baseline risk assessment.
  - a. The calculation of risk estimates for site-related COPCs only.
  - b. The further evaluation of non-site-related COPCs in the risk characterization section only (e.g., the qualitative evaluation of chemicals detected at concentrations exceeding screening criteria but less than background concentrations). The Navy considers this evaluation to be consistent with USEPA's Role of Background in the CERCLA Cleanup Program (USEPA, 2002).
- 4. The selection of site cleanup remedial goals at levels not less than background levels. Additionally, cleanup levels should not be developed for chemicals not identified as COCs. As defined in the Navy guidance, COCs are site-related COPCs found to be the risk drivers in the baseline risk assessment and that may pose unacceptable human or ecological risks.

## 5.1.2.2 Decision Rules for Establishing COPCs

The following decision rules were used to select initial lists of COPCs for the Site:

- A chemical detected in soil was selected as a COPC for soil if any detected chemical concentration exceeded the USEPA or RIDEM direct contact screening levels for soil and, for inorganics, if the background evaluation indicates the site concentrations are not within naturally occurring levels. This is shown in Appendix G.
- A chemical detected in groundwater was selected as a COPC for groundwater if the maximum detected concentration in any on-site monitoring wells exceeded the USEPA or RIDEM direct contact screening levels.
- A chemical detected in soil gas was selected as a COPC for soil gas if the maximum detected concentration in soil gas exceeded the USEPA screening levels soil gas.

As indicated in Section 5.1.2.1, chemicals with concentrations exceeding the screening criteria for migration from soil to groundwater were not retained as COPCs for quantitative evaluation in the risk assessment.

## 5.1.3 COPCs Selected for the HHRA

As previously discussed in Section 1.0, the Site is divided into five areas; the North Waterfront, Central Shipyard, former Building 234, South Waterfront, and the PCB Removal area as illustrated in Figure 1-2. These areas were evaluated separately in this HHRA. Surface soil and subsurface soil samples were collected at the North Waterfront, Central Shipyard, former Building 234, and PCB removal area. Only subsurface soil samples were collected at the South Waterfront. Groundwater samples were only collected at the North Waterfront, Central Shipyard, and former Building 234 area. In addition, soil gas samples were collected at the North Waterfront.

COPCs for these areas were selected using the risk-based COPC screening levels described in Section 5.1.2. A discussion of the chemicals identified as COPCs and the rationale for COPC selection is provided in the following subsections. A discussion of nature and extent of the chemicals detected in site media is presented in Section 4.0 and is not repeated in this section. COPC selection information for each medium is presented in Tables 5-4 through 5-28. Chemicals retained as COPCs for the five areas are presented in Table 5-29. RAGS Part D tables for COPC selection are included in Appendix F.2.

#### 5.1.3.1 North Waterfront Surface Soil

Nine VOCs, 21 SVOCs, 8 pesticides, 20 inorganics, and several miscellaneous chemicals were detected in surface soil samples collected at the North Waterfront portion of the Site. A comparison of maximum detected surface soil concentrations to screening levels based on RSLs and RIDEM DECs for residential exposures is presented in Table 5-4. The following chemicals were detected at maximum concentrations exceeding direct contact COPC screening levels and were retained as COPCs for surface soil at the North Waterfront:

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene].
- Inorganics (chromium, cobalt, and iron).

The maximum detected concentration of cobalt and iron exceeded the screening toxicity levels (set at a HQ of 0.1); however, they do not exceed the RSLs. Concentrations of benzo(a)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and chromium exceeded the screening criteria based on the RSLs, but were less than the RIDEM DECs. Concentrations of chrysene exceeded its RIDEM DEC, but were less than the screening criteria based on the RSLs. Concentrations of aluminum, arsenic, and manganese also exceeded the screening levels but were within naturally occurring levels and are not

considered to be site related (Appendix G), therefore these chemicals were not retained as COPCs for direct contact with surface soil.

A comparison of maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-5. The following chemicals were detected in surface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at the North Waterfront:

- VOCs [benzene and TCE]
- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, hexachloroethane, naphthalene, and 2,2'-oxybis(1-chloropropane].
- Pesticides (alpha-chlordane, Dieldrin, gamma-chlordane, and heptachlor epoxide).
- Metals (cadmium, chromium, copper, lead, nickel, selenium, and zinc).

Of these chemicals, only TCE, chromium, copper, nickel, and zinc were detected in groundwater samples collected at the North Waterfront. Concentrations of lead in toxicity characteristic leaching procedure (TCLP) samples also exceeded the RIDEM GA leachability criteria. Lead was the only chemical detected at concentrations exceeding the RIDEM GA leachability criteria. Concentrations of arsenic, manganese, and mercury also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G). As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for dibutyltin, monobutyltin, tetrabutyltin, and tributyltin. The uncertainty associated with the lack of screening criteria for these chemicals is discussed in Section 5.5.1, the Uncertainty Analysis.

#### 5.1.3.2 North Water Front Subsurface Soil

Seven VOCs, 18 SVOCs, 5 pesticides/PCBs, 20 inorganics, and several miscellaneous chemicals were detected in subsurface soil at the North Waterfront. A comparison of maximum detected subsurface soil concentrations to screening levels based on the RSLs and RIDEM DECs for residential exposure is presented in Table 5-6. The following chemicals were detected at maximum concentrations exceeding direct contact COPC screening levels and were retained as COPCs for subsurface soil at the North Waterfront:

- SVOCs [benzo(a)pyrene and dibenzo(a,h)anthracene]
- Inorganics (aluminum, chromium, cobalt, and iron).

Concentrations of benzo(a)pyrene, dibenzo(a,h)anthracene, and chromium exceeded screening criteria based on RSLs, but were less than the RIDEM DECs. Concentrations of arsenic and manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G); therefore these chemicals were not retained as COPCs for direct contact with subsurface soil.

A comparison of maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-7. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at the North Waterfront:

- VOCs (TCE).
- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate), dibenzo(a,h)anthracene, and naphthalene].
- Pesticides/PCBs (Aldrin, alpha-chlordane, and heptachlor).
- Metals (arsenic, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, and selenium).

Of these chemicals, only TCE, arsenic, cadmium, chromium, copper, iron, and nickel were detected in groundwater samples collected at the North Waterfront. Concentrations of lead in TCLP samples also exceeded the RIDEM GA leachability criteria. Lead was the only chemical detected at concentrations exceeding the RIDEM GA leachability criteria. Concentrations of manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G). As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for tetrabutyltin and tributyltin. The uncertainty associated with the lack of screening criteria for these chemicals is discussed in Section 5.5.1, the Uncertainty Analysis.

#### 5.1.3.3 North Waterfront Groundwater

Seven VOCs and 13 inorganics were detected in groundwater samples collected at the North Waterfront. A comparison of maximum detected groundwater concentrations to screening levels based on RSLs for tap water, USEPA MCLs, and RIDEM GA groundwater objectives is presented in Table 5-8. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at the North Waterfront:

- VOCs (cis-1,2-dichloroethene, TCE, and vinyl chloride).
- Metals (Total) [aluminum, arsenic, chromium, iron, and manganese]
- Metals (Dissolved) [aluminum and manganese].

Concentrations of cis-1,2-dichloroethene and manganese exceeded screening toxicity levels (set at a HI of 0.1) but did not exceed RSLs. TCE and arsenic were the only chemicals detected at a concentration exceeding the RIDEM GA groundwater objectives.

A comparison of maximum detected groundwater VOC concentrations to USEPA screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in Table 5-9. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at the North Waterfront:

VOCs (TCE, and vinyl chloride).

#### 5.1.3.4 North Waterfront Soil Gas

Thirty-five VOCs were detected in soil gas samples collected at the North Waterfront. A comparison of maximum detected soil gas concentrations to USEPA screening levels is presented in Table 5-10. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for soil gas at the North Waterfront:

VOCs (1,3-butadiene, acrylonitrile, benzene, tetrachloroethene and TCE).

1,3-Butadiene and acrylonitrile were not detected in any surface soil, subsurface soil, or groundwater samples collected at the North Waterfront.

## 5.1.3.5 Central Shipyard Surface Soil

Eighteen SVOCs, 3 pesticides/PCBs, 20 inorganics, and several miscellaneous chemicals were detected in surface soil samples collected at the Central Shipyard. A comparison of maximum detected surface soil concentrations to screening levels based on RSLs and RIDEM DECs for residential exposure is presented in Table 5-11. The following chemicals were detected at maximum concentrations exceeding the direct contact COPC screening levels, and were retained as COPCs for surface soil at the Central Shipyard:

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene].
- Inorganics (arsenic, chromium, cobalt, iron, and manganese).

The maximum detected concentration cobalt, iron, and manganese exceeded screening toxicity levels (set at a HQ of 0.1) but did not exceed RSLs. Concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chromium exceeded the screening criteria based on the RSLs but were less than the RIDEM DECs. Concentrations of chrysene exceeded RIDEM DECs but were less than the screening criteria based on the RSLs. Concentrations of aluminum also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore aluminum was not retained as a COPC for direct contact with surface soil.

There are no direct contact COPC screening criteria available for carbazole. The uncertainty associated with the lack of screening criteria for carbazole is discussed in Section 5.5.1, the Uncertainty Analysis.

A comparison of the maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-12. The following chemicals were detected in surface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at Central Shipyard:

- SVOCs [2,2'-oxybis(1-chloropropane), 4-methylphenol, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene].
- Pesticides/PCBs (Aroclor-1260).
- Metals (arsenic, cadmium, chromium, cobalt, copper, iron, manganese, nickel, and selenium).

SVOCs and copper were not detected in groundwater samples collected at the Central Shipyard. Concentrations of all chemicals were less than the RIDEM GA leachability criteria. Concentrations of arsenic in TCLP samples were less than the RIDEM GA leachability criteria. Concentrations of lead and

mercury exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G). As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for carbazole, creosote, tetrabutyltin, and tributyltin. The uncertainty associated with the lack of screening criteria for these chemicals is discussed in Section 5.5.1, the Uncertainty Analysis.

## 5.1.3.6 Central Shipyard Subsurface Soil

Five VOCs, 18 SVOCs, 5 pesticides/PCBs, 20 inorganics, and two miscellaneous chemicals were detected in subsurface soil samples at the Central Shipyard. A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs and RIDEM DECs for residential exposure is presented in Table 5-13. The following chemicals were detected at maximum concentrations exceeding the direct contact COPC screening levels and were retained as COPCs for subsurface soil at the Central Shipyard:

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene].
- Inorganics (aluminum, arsenic, chromium, cobalt, and iron).

Concentrations of dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and chromium exceeded the screening criteria based on the RSLs but were less than the RIDEM DECs. Concentrations of chrysene exceeded RIDEM DECs, but were less than the screening criteria based on the RSLs. Concentrations of manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore manganese was not retained as a COPC for direct contact with subsurface soil.

A comparison of maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-14. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at the Central Shipyard:

SVOCs [2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene].

- Pesticides/PCBs (4,4'-DDD, 4,4'-DDT, total Aroclors)
- Metals (arsenic, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, selenium, and silver).

Lead was the only chemical detected at concentrations exceeding the RIDEM GA leachability criteria. SVOCs, copper, mercury, and silver were not detected in groundwater samples collected at the Central Shipyard. Concentrations of manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G). As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for tetrabutyltin and tributyltin. The uncertainty associated with the lack of screening criteria for these chemicals is discussed in Section 5.5.1, the Uncertainty Analysis.

## 5.1.3.7 Central Shipyard Groundwater

Acetone and 16 metals were detected in groundwater samples collected at Central Shipyard. A comparison of maximum detected groundwater concentrations to screening levels based on RSLs for tap water, USEPA MCLs, and RIDEM GA groundwater objectives is presented in Table 5-15. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at the Central Shipyard:

- Metals (Total) (aluminum, arsenic, cadmium, chromium, cobalt, iron, and manganese).
- Metals (Dissolved) (arsenic, cadmium, cobalt, iron, and manganese).

Concentrations of all chemicals with the exception of arsenic were less than the RIDEM GA groundwater objectives.

A comparison of maximum detected groundwater VOC concentrations to USEPA screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in Table 5-16. Concentrations of all chemicals were less than the associated screening levels.

## 5.1.3.8 Former Building 234 Surface Soil

Two VOCs, 18 SVOCs, 6 pesticides/PCBs, 20 inorganics, and 2 miscellaneous chemicals were detected in surface soil samples collected at former Building 234. A comparison of maximum detected surface soil concentrations to screening levels based on RSLs and RIDEM DECs for residential exposure is presented in Table 5-17. The following chemicals were detected at maximum concentrations exceeding the direct contact COPC screening levels and were retained as COPCs for surface soil at former Building 234:

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene].
- Inorganics (arsenic, beryllium, cadmium, chromium, cobalt, iron, lead, and manganese).

The maximum detected concentrations of cadmium, iron, and manganese exceeded screening toxicity levels (set at a HQ of 0.1), but did not exceed RSLs. Concentrations of benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene, cadmium, and chromium exceeded the screening criteria based on the RSLs, but were less than the RIDEM DECs. Concentrations of chrysene, beryllium, and lead exceeded RIDEM DECs, but were less than the screening criteria based on the RSLs. Concentrations of aluminum also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore aluminum was not retained as COPCs for direct contact with surface soil.

There are no COPC screening criteria available for carbazole and creosote. The uncertainty associated with the lack of screening criteria for carbazole and creosote is discussed in Section 5.5.1, the Uncertainty Analysis.

A comparison of the maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-18. The following chemicals were detected in surface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at former Building 234:

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene].
- Pesticides/PCBs (Aroclor-1254, gamma-chlordane, and heptachlor).

 Metals (arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, and zinc).

Selenium was not detected in groundwater samples collected at former Building 234. Lead was the only chemical detected at concentrations exceeding the RIDEM GA leachability criteria. As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for carbazole, creosote, di-n-octyl phthalate, tetrabutyltin, and tributyltin. The uncertainty associated with the lack of screening criteria for these chemicals is discussed in Section 5.5.1, the Uncertainty Analysis.

#### 5.1.3.9 Former Building 234 Subsurface Soil

Six VOCs, 16 SVOCs, heptachlor, 21 inorganics, and tetrabutyltin were detected in subsurface soil samples at the Former Building 234. A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs and RIDEM DECs for residential exposure is presented in Table 5-19. The following chemicals were detected at maximum concentrations exceeding the direct contact COPC screening levels and were retained as COPCs for subsurface soil at former Building 234:

- SVOCs [benzo(a)pyrene].
- Inorganics (aluminum, arsenic, chromium, cobalt, and iron).

Concentrations of benzo(a)pyrene and chromium exceeded the screening criteria based on the RSLs, but were less than the RIDEM DECs. Concentrations of manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore manganese was not retained as a COPC for direct contact with subsurface soil.

A comparison of maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-20. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at former Building 234:

VOCs (benzene, ethylbenzene, and TCE)

- SVOCs [2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2ethylhexyl)phthalate, naphthalene]
- Pesticides/PCBs (heptachlor)
- Metals (aluminum, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, and silver)

Naphthalene was the only chemical detected at concentrations exceeding the RIDEM leachability criteria. Of these chemicals, only TCE, arsenic, and nickel were detected in groundwater samples collected at former Building 234. As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for creosote and tetrabutyltin. The uncertainty associated with the lack of screening criteria for creosote and tetrabutyltin is discussed in Section 5.5.1, the Uncertainty Analysis.

## 5.1.3.10 Former Building 234 Groundwater

Six VOCs and 16 metals were detected in groundwater samples collected at former Building 234. A comparison of maximum detected groundwater concentrations to screening levels based on RSLs for tap water, USEPA MCLs, and RIDEM GA groundwater objectives is presented in Table 5-21. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at former Building 234:

- VOCs (cis-1,2-dichloroethene, TCE, and vinyl chloride)
- Metals (Total) (aluminum, arsenic, chromium, cobalt, iron, and manganese)
- Metals (Dissolved) (arsenic, cobalt, iron, and manganese)

The maximum detected concentrations of cis-1,2-dichloroethene, cobalt (total and dissolved), iron (total), and manganese (dissolved) exceeded screening toxicity levels (set at a HQ of 0.1), but did not exceed RSLs. Vinyl chloride and arsenic were the only chemicals detected at a concentration exceeding the RIDEM GA groundwater objectives.

A comparison of maximum detected groundwater VOC concentrations to USEPA screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in

Table 5-22. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at former Building 234:

VOCs (TCE and vinyl chloride)

#### 5.1.3.11 South Waterfront Subsurface Soil

Three PAHs and 18 inorganics were detected in subsurface soil at the South Waterfront. A comparison of maximum detected subsurface soil concentrations to screening levels based on the RSLs and RIDEM DECs for residential exposure is presented in Table 5-23. The following chemicals were detected at maximum concentrations exceeding direct contact COPC screening levels and were retained as COPCs for subsurface soil at the South Waterfront:

Inorganics (aluminum, arsenic, chromium, cobalt, and iron)

Concentrations of manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore manganese was not retained as a COPC for direct contact with subsurface soil.

A comparison of maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-24. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at the South Waterfront:

- PAHs [benzo(b)fluoranthene]
- Metals (arsenic, cadmium, chromium, cobalt, copper, iron, lead, and nickel)

Concentrations of all chemicals were less than the RIDEM GA leachability criteria. As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

#### 5.1.3.12 PCB Removal Area Surface Soil

Seventeen PAHs, Aroclor-1260, and 20 inorganics were detected in surface soil samples collected at the PCB removal area. A comparison of maximum detected surface soil concentrations to screening levels

based on RSLs and RIDEM DECs for residential exposure is presented in Table 5-25. The following chemicals were detected at maximum concentrations exceeding the direct contact risk-based COPC screening levels and were retained as COPCs for surface soil at the PCB removal area:

- PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene]
- PCBs (Aroclor-1260, Total Aroclors)
- Inorganics (arsenic, cobalt, iron, and manganese)

The maximum detected concentration of manganese exceeded screening toxicity levels (set at a HQ of 0.1) but did not exceed RSLs. Concentrations of total Aroclors exceeded the screening criteria based on the RSLs but were less than the RIDEM DECs. Concentrations of benzo(g,h,i)perylene and chrysene exceeded RIDEM DECs but were less than the screening criteria based on the RSLs. Concentrations of aluminum and chromium also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore these chemicals were not retained as COPCs for direct contact with surface soil.

A comparison of the maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-26. The following chemicals were detected in surface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at PCB removal area:

- PAHs [2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene]
- PCBs (Aroclor-1260 and total Aroclors)
- Metals (arsenic, cadmium, cobalt, copper, iron, lead, manganese, nickel, and selenium).

Concentrations of all chemicals were less than the RIDEM GA leachability criteria when available. Concentrations of chromium also exceeded the screening levels, but were within naturally occurring levels and are not considered to be site related (Appendix G). As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

#### 5.1.3.13 PCB Removal Area Subsurface Soil

Seventeen PAHs, total Aroclors, and 21 metals were detected in subsurface soil samples at the PCB Removal area. A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs and RIDEM DECs for residential exposure is presented in Table 5-27. The following chemicals were detected at maximum concentrations exceeding the direct contact risk-based COPC screening levels and were retained as COPCs for subsurface soil at the PCB removal area:

- PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene]
- Inorganics (aluminum, arsenic, chromium, cobalt, iron, and manganese)

The maximum detected concentrations of aluminum, iron, and manganese exceeded screening toxicity levels (set at a HQ of 0.1) but did not exceed RSLs. Concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and chromium exceeded the screening criteria based on the RSLs, but were less than the RIDEM DECs.

A comparison of maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-28. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at the PCB removal area:

- PAHs [2-mehtylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, naphthalene]
- PCBs (Total Aroclors)
- Metals (antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, and zinc)

Concentrations of all chemicals were less than the RIDEM GA leachability criteria when available. As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

#### 5.1.3.14 Summary

Table 5-29 summarizes the chemicals retained as COPCs for direct contact exposures to surface soil, subsurface soil, groundwater, and soil gas at the North Waterfront, Central Shipyard, former Building 234,

South Waterfront, and PCB removal area. RAGS Part D tables for COPC selection are included in Appendix F.2.

#### 5.2 EXPOSURE ASSESSMENT

The exposure assessment portion of the risk assessment defines and evaluates, quantitatively or qualitatively, the type and magnitude of human exposure to the chemicals present at or migrating from a site. The exposure assessment is designed to depict the physical setting of the site, to identify potentially exposed populations and applicable exposure pathways, to calculate concentrations of COPCs to which receptors might be exposed, and to estimate chemical intakes under the identified exposure scenarios.

Actual or potential exposures at the Site were determined based on the most likely pathways of contaminant release and transport, as well as human activity patterns. A complete exposure pathway has three components: a source of chemicals that can be released to the environment, a route of contaminant transport through an environmental medium, and an exposure or contact point for a human receptor.

## 5.2.1 <u>Conceptual Site Model</u>

A conceptual site model (CSM) facilitates consistent and comprehensive evaluation of potential risks to human health by creating a framework for identifying the pathways by which human receptors may come in contact with environmental media contaminated by site activities. A CSM depicts the relationships among the following elements, which are necessary for defining complete exposure pathways:

- Site sources of contamination
- Contaminant release mechanisms and transport/migration pathways
- Exposure routes
- Potential receptors

The elements of the CSM (contaminant source, release mechanisms, transport/migration pathways, exposure routes, and potential receptors) establish the manner and degree to which a potential receptor may be exposed to chemicals present at the site. The degree of risk incurred by a potential receptor varies according to the means of exposure, the duration of exposure, and the specific chemical to which the receptor is exposed.

Section 1 and 2 of this document presented a detailed discussion on site location, site description, and site history for the five subareas of the Site. This section summarizes the information previously presented in Section 2.0 as it applies to the HHRA. Sources of contamination, contaminant release mechanisms, transport and migration pathways, exposure routes, and potential receptors are defined. Table 5-30 provides a site-specific summary of the potential receptors evaluated for the Site. A summary of the exposure routes addressed quantitatively for each human receptor is provided in Table 5-31. Figure 5-1 illustrates the CSM for the Site.

## 5.2.1.1 Site Sources of Environmental Contamination

Summarizing from the Site history information presented in Section 1, the Site was leased by the Navy to the Rhode Island Port Authority who in turned leased the property to the Derecktor Shipyard. The Derecktor Shipyard operated from 1979 to January 1992. The Site was used by Derecktor to repair, maintain, and construct private and military ships. Repair, maintenance, and construction operations were concentrated in the Building 234 area. These operations consisted of sand blasting, painting, hull inspections, and other on-board ship repairs.

Derecktor also constructed new ships under contract to the USCG and U.S. Army. These ships were steel-structured, such as cutters and tugboats, built from the keel up, and outfitted for initial sea trials. Construction included cutting and welding steel, sand blasting, priming and painting the structure, and final ship assembly, which was completed primarily in Building 234. Supporting the ship maintenance and construction operations was an engineering department, a machine shop, an electrical shop, a pipe shop, and a vehicle maintenance shop.

#### 5.2.1.2 Potential Contaminant Release Mechanisms and Transport/Migration Pathways

The soil and groundwater data collected at the Site indicate that past activities have released contaminants to the surrounding environment. Once chemicals have been released to an environmental medium (e.g., soil), they may migrate within that medium, or migrate to another environmental medium (e.g., air). This section summarizes potential containment release mechanisms and transport pathways.

Contaminants in surface soil could migrate to air through wind erosion or through volatile emissions. Subsurface soil is not currently exposed at the site; however, if future construction occurs and brings subsurface soil to the surface, contaminants in subsurface soil could be transported into the air through wind erosion or through volatile emissions (fugitive dusts) may then be deposited off site if the grain size is small enough and the wind speed is great enough. Additionally, contaminants may be released from soil

by volatilization if present at significant concentrations. However, portions of the Site are paved which significantly limits the potential for airborne emissions from the Site.

Contaminants can also migrate from both surface and subsurface soil to groundwater through leaching of chemicals in the soil. The groundwater underlying the Site is primarily recharged through infiltration of precipitation and subsurface flow from upgradient/adjacent areas. This allows for migration of contaminants downward through the buried wastes/soil column to the shallow groundwater. Shallow groundwater at the site discharges to Narragansett Bay.

#### 5.2.1.3 Potential Current and Future Receptors of Concern and Exposure Pathways

The baseline HHRA prepared for the Site considered receptor exposure under residential and non-residential (e.g., industrial, recreational) land-use scenarios. The following receptors were identified in the previous HHRA (B&RE, January 1997):

- Industrial Worker A plausible receptor under current and future land use. This receptor could be directly exposed to surface soil (incidental ingestion; dermal contact) and airborne particulates and vapors from surface soil (inhalation). Under current land use the industrial worker could only be exposed to surface soil in the unpaved areas of the Site. Under future land use the industrial worker could be exposed to all surface soil if the pavement at the Site was removed. Figure 1-2 shows the unpaved and paved areas. If groundwater was used as a drinking water supply then the industrial worker could be exposed to groundwater (ingestion; dermal contact). Industrial worker exposure to subsurface soil is unlikely; however, because future construction could potentially bring subsurface soil to the surface, exposure to subsurface soil via incidental ingestion, dermal contact, and inhalation was evaluated for this receptor to aid in risk management decisions. If this receptor worked in a hypothetical on-site structure, it is also plausible that this receptor could be exposed to VOCs migrating from contaminated subsurface soil or groundwater to the indoor air of a building.
- Construction Workers A plausible on-site receptor under current and future land use. Construction workers could be exposed to surface and subsurface soils (incidental ingestion; dermal contact), shallow groundwater (dermal contact), as well as airborne contaminants emanating from these media (inhalation). It should be noted that significant exposure to groundwater by a construction worker is unlikely because if a construction worker were to have prolonged contact with groundwater then he/she would most likely wear protective clothing such as rubber boots and/or hip waders, which would limit the receptor's exposure. In addition, most excavation activities would utilize construction equipment such as a back hoe, which would limit a construction worker's exposure. Also, if significant groundwater was encountered during an excavation of a trench or

foundation, the groundwater would most likely be pumped out of the excavation so that the construction activities could be completed.

- Adolescent and Adult Trespassers A plausible receptor under current and future land use. Trespassers are individuals using the site for passive activities including walking or hiking two days a week during the warmer months of the year (mid-April through mid-October). A trespasser may be exposed to potentially contaminated surface soil (incidental ingestion; dermal contact), air (inhalation). Under current land use trespassers could only be exposed to surface soil in the unpaved areas of the Site. Under future land use trespassers could be exposed to all surface soil if the pavement at the Site was removed. Trespasser exposure to subsurface soil is unlikely; however, because future construction could potentially bring subsurface soil to the surface, exposure to subsurface soil via incidental ingestion, dermal contact, and inhalation was evaluated for this receptor to aid in risk management decisions. Direct contact with groundwater is not anticipated for this receptor.
- Hypothetical Child and Adult Residents Given the anticipated future land use for much of the Site (commercial/industrial), residents are a very unlikely future receptor. However, the hypothetical future residential scenario is typically evaluated in a risk assessment for decision-making purposes. For example, the need for deed restrictions at a site may be eliminated prior to site closure if minimal risks are estimated for residential receptors. It is assumed that a hypothetical resident may be exposed to surface soil (ingestion; dermal contact, inhalation), groundwater (ingestion; dermal contact, inhalation), and air (inhalation). Also, hypothetical residents could be exposed to VOCs migrating from contaminated subsurface soil or groundwater to the indoor air of a home. Receptor exposure to subsurface soil would only occur if subsurface soil was excavated and deposited on existing surface soil. Although this is an unlikely scenario, it is included in this HHRA for purposes of completeness and to assist the risk managers regarding the need for deed restrictions.

## 5.2.2 <u>Exposure Point Concentrations</u>

The exposure point concentration (EPC), which is calculated for COPCs only (both site related and non-site related [i.e., naturally occurring/non-site-related anthropogenic chemicals]), is an estimate of the chemical concentration within an exposure unit (EU). The EPC is assumed to be the concentration to which the receptor is exposed and is used to estimate exposure intakes. An EU is the area over which receptor activity is expected to occur. The following paragraphs discuss the EUs evaluated in this HHRA and the guidelines for calculating EPCs.

As previously discussed, the North Waterfront, Central Shipyard, former Building 234, South Waterfront, and PCB Removal area were evaluated as separate EUs (Figure 1-2). EPCs were calculated for surface

soil (0 - 2 ft bgs), subsurface soil (> 2 ft bgs), and groundwater. Soils were differentiated from surface and subsurface in anticipation of any future removal actions which would target the surface soil interval.

The following guidelines were used to calculate EPCs:

- For surface soil and subsurface soil the 95-percent upper confidence limit (UCL) on the arithmetic mean, which was based on the distribution of the data set, was selected as the EPC. EPCs were calculated following USEPA's Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (December 2002) and using USEPA's ProUCL software Version 4.1.01. If ProUCL was unable to calculate an UCL then the maximum detected concentration was used as the EPC. The uncertainty associated with using the maximum detected concentration as the EPC is discussed in the uncertainty analysis in Section 5.2.2.
- Two EPCs were calculated for surface soil. The first EPC was calculated using only surface soil samples for the unpaved areas in each EU. This EPC was used to evaluate exposures to surface soil for all receptors with the exception of construction workers under the current land use scenario. The second EPC was calculated assuming the pavement was removed at each EU and therefore the receptors could be exposed to all surface soil. Figure 1-2 shows the unpaved and paved areas. The second EPC was used to evaluate surface soil under future land use. The second EPC was also used to evaluate exposures to construction workers under the current land use scenario. Appendix F.1 identifies the samples for the paved and unpaved areas. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene were identified as COPCs in surface soil at the Central Shipyard. COPCs were selected using all surface soil samples for the paved and unpaved area. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene were not detected in surface soil samples from the unpaved areas in the Central Shipyard, therefore these chemicals were not evaluated in this HHRA.
- The groundwater samples were collected in 1996 and 2011. All groundwater samples were used to identify COPCs for groundwater, but only the 2011 groundwater samples were used to evaluate potential exposures to groundwater since this data is representative of the current conditions at the Site. There were not enough groundwater samples available to calculate an UCL therefore the maximum detected concentration in the 2011 groundwater samples was used as the EPC for groundwater. Appendix F.1 lists the samples which were used to derive the EPCs for groundwater. Arsenic was identified as a COPC in groundwater at the North Waterfront and chromium was identified as a COPC in groundwater at the Central Shipyard and Former Building 234. These compounds were detected in groundwater samples collected in 1996 but were not detected in the latest groundwater samples collected in 2011. Therefore, exposures to arsenic in groundwater at the

North Waterfront and chromium in groundwater at the Central Shipyard and Former Building 234 were not evaluated in this HHRA.

- Non-detected values were evaluated in accordance with the ProUCL guidance. Duplicates were averaged for purposes of calculating EPCs for COPCs in environmental media. In calculating the averages, if one sample was detected and the other was non-detected then the average was calculated using the detected value and one half the non-detected value.
- As stated in the guidance manual for the Integrated Exposure Uptake Biokinetic (IEUBK) model (USEPA, 1994) the arithmetic mean concentration will be used as the EPC for lead.
- The same EPCs were used to evaluate both reasonable maximum exposure (RME) and central tendency exposure (CTE) scenarios.

Table 5-32 summarizes the EPCs used in this HHRA. ProUCL Outputs are included in Appendix F.3. RAGS Part D Tables for the EPCs are presented in Appendix F.2. Appendix F.1 lists the samples which were used to derive the EPCs for soil and groundwater.

## 5.2.3 Chemical Intake Estimation

The methodologies and techniques used to estimate exposure intakes are presented in this section. Intakes for the identified potential receptor groups were calculated using current USEPA risk assessment guidance and are presented in the risk assessment spreadsheets. Risk assessment results are presented using USEPA RAGS Part D table format. Assumptions regarding exposure are presented in Table 5-33. The exposure assumptions presented in Table 5-33 are based on current USEPA and RIDEM risk assessment guidance and are the same as those used in the HHRAs for Site 8 (NUSC) (Tetra Tech, January 2010) and Tank Farm 4 and 5 (Tetra Tech, January 2011) at NAVSTA Newport.

Non-carcinogenic intakes were estimated using the concept of an average annual exposure. Carcinogenic intakes were calculated as incremental lifetime exposures, which assume a life expectancy of 70 years. The exposure assumptions reflect current USEPA guidance. The majority of the exposure assumptions used to estimate chemical intakes were based on default assumptions described in several USEPA guidance documents (e.g., USEPA December 1989, March 1991, August 1997, and July 2004) and RIDEM guidance (February 2004). The RIDEM guidance only contains exposure assumptions for industrial workers and residents exposed to soil via incidental ingestion and inhalation routes of exposure. RIDEM does not have default exposure assumptions for construction workers, trespassers, or recreational users. The following paragraphs discuss the non-default receptor-specific exposure assumptions used in the risk assessment.

## 5.2.3.1 Incidental Ingestion of Soil

Direct physical contact with soil may result in the incidental ingestion of chemicals. Chemical intake for the incidental ingestion of soil is estimated in the following manner (USEPA, December 1989):

Intake = 
$$\frac{(C_s)(IR)(FI)(EF)(ED)(CF)}{(BW)(AT)}$$

where:

Intake = intake of chemical from soil (mg/kg/day)

C<sub>s</sub> = concentration of chemical in soil (mg/kg)

IR = ingestion rate (mg/day)

FI = fraction ingested from contaminated source (dimensionless)

EF = exposure frequency (days/year [yr])

ED = exposure duration (yr)

CF = conversion factor  $(1 \times 10^{-6} \text{ kg/mg})$ 

BW = body weight (kg)

AT = averaging time (days);

for non-carcinogens,  $AT = ED \times 365 \text{ days/yr}$ 

for carcinogens, AT = 70 yr x 365 days/yr

Most of the exposure assumptions used to estimate chemical intakes from incidental ingestion of soil were based on default assumptions described in standard USEPA guidance and are summarized in Table 5-33. The following paragraphs briefly discuss the non-default receptor-specific exposure assumptions for incidental ingestion of soil that were used in the HHRA.

The selected exposure frequency assumptions consider anticipated receptor activities at the Site. It is assumed that construction workers assigned to future excavation projects at the Site are exposed to soil for 5 days a week over 6 months (130 days a year) for 1 year. It is assumed that adolescent and adult trespassers are exposed to soil for 2 days per week over 24 weeks (48 days a year).

#### 5.2.3.2 Dermal Contact with Soil

Direct physical contact with soil may result in the dermal absorption of chemicals. Exposure associated with dermal contact with soil is estimated in the following manner (USEPA, December 1989):

Intake = 
$$\frac{(C_s)(SA)(AF)(ABS)(CF)(EF)(ED)}{(BW)(AT)}$$

where:

Intake = amount of chemical absorbed during contact with soil (mg/kg/day)

C<sub>s</sub> = concentration of chemical in soil (mg/kg)

SA = skin surface area available for contact  $(cm^2/day)$ 

AF = skin adherence factor (mg/cm²)

ABS = absorption factor (dimensionless)

CF = conversion factor (1 x 10<sup>-6</sup> kg/mg)

EF = exposure frequency (days/year)

ED = exposure duration (year)

BW = body weight (kg)

AT = averaging time (days);

for non-carcinogens,  $AT = ED \times 365 \text{ days/year}$  for carcinogens,  $AT = 70 \text{ years } \times 365 \text{ days/year}$ 

Most of the exposure assumptions used to estimate chemical intakes from dermal contact with soil were based on the default assumptions described in standard USEPA guidance and are summarized in Table 5-33. The following paragraphs briefly discuss non-default receptor-specific exposure assumptions for dermal contact with soil that were used in the HHRA.

The exposed skin surface areas of the body available for dermal contact with soil were determined on a receptor-specific basis because they correspond with assumed human activities and clothing worn during exposure events. With the exception of the skin surface area recommended for adolescent trespassers exposed to soil, all of the skin surface areas presented in Table 5-33 are based on USEPA default values. Current guidance (USEPA August 1997 and July 2004) was used to develop the skin surface area available for contact for the adolescent trespasser as follows:

• For the adolescent trespasser, the skin surface area available for soil contact is 5,500 cm<sup>2</sup> (which assumes that the head, forearms, hands, lower legs, and feet are exposed).

A summary of the receptor-specific input values used to estimate chemical intakes from dermal contact with soil are presented in Table 5-33. The same exposure frequencies and durations recommended for the evaluation of incidental ingestion of soil were used to estimate chemical intakes for dermal contact with soil. The soil adherence factors presented are those in Exhibits 3.3 and 3.5 of RAGS Part E.

To the extent possible, chemical-specific dermal absorption factors provided in RAGS Part E were used to evaluate the COPCs for soil. However, dermal absorption factors are only available for the short list of chemicals in Exhibit 3-4 of RAGS Part E. In addition, as indicated in RAGS Part E, absorption factors for metals other than arsenic and cadmium have not been developed due to insufficient data to support default values. Therefore, ABS was set equal to zero for these chemicals and risks from dermal absorption of metals other than arsenic and cadmium from soil were not quantified in this risk assessment. The uncertainty associated with the omission of these constituents is discussed in the uncertainty analysis. Dermal absorption values used in this HHRA are presented in Table 5-34.

### 5.2.3.3 Inhalation of Air Containing Fugitive Dust/Volatiles Emitted from Soil

Intakes of both particulates and vapors/gases are calculated using the same equation, as follows (USEPA, January 2009):

$$EC = \frac{(C_{air})(ET)(EF)(ED)}{AT \times 24 \text{ hrs/day}}$$

where:

EC = exposure concentration (mg/m<sup>3</sup>)

 $C_{air}$  = concentration of chemical in air (mg/m<sup>3</sup>)

ET = exposure time (hours/day)

EF = exposure frequency (days/yr)

ED = exposure duration (yr)

AT = averaging time (hours);

= for non-carcinogens, AT = ED x 365 days/yr

= for carcinogens, AT = 70 yr x 365 days/yr

Some of the exposure assumptions used to estimate chemical intakes from inhalation of fugitive dusts/volatile emissions from surface and subsurface soil were based on default assumptions described in standard USEPA guidance and are summarized in Table 5-33. The same exposure frequencies and durations used to estimate incidental ingestion of soil intakes were used to estimate exposure via inhalation of fugitive dust/volatile emissions for surface and subsurface soil.

The concentrations of chemicals in air resulting from emissions from soil are developed following procedures presented in USEPA Soil Screening Guidance (December 2002). Chemical concentrations in air were calculated as follows:

$$C_{air} = C_{soil} \times \left[ \frac{1}{PEF} + \frac{1}{VF} \right]$$

where:

 $C_{air}$  = chemical concentration in air (mg/m³)  $C_s$  = chemical concentration in soil (mg/kg) PEF = Particulate emission factor (m³/kg)

VF = volatilization factor (m<sup>3</sup>/kg)

No volatile chemicals were retained as COPCs in surface and subsurface soil, therefore the above equation reduces to:

$$C_{air} = C_{soil} \times \left[ \frac{1}{PEF} \right]$$

The particulate emissions factor (PEF) relates the concentration of the chemical in soil to the concentration of dust particles in air. A PEF value of 1.1 x 10<sup>+10</sup> m<sup>3</sup>/kg was obtained from USEPA's Soil Screening internet site at http://rais.ornl.gov/epa/ssl1.shtml. This is the default value for Hartford, Connecticut, which is the closest city to the Site listed on the Internet site. Because air emissions resulting from fugitive dust emissions settings will be different than dust emissions generated during construction activities, a separate PEF was used for construction activities. The PEF for construction workers (1.4x10<sup>+6</sup> m<sup>3</sup>/kg) was calculated using the equations presented in the supplemental SSL guidance document (USEPA, December 2002). Sample calculations showing how the PEFs were calculated are presented in Appendix F.4.

### 5.2.3.4 Ingestion of Groundwater

Ingestion of groundwater is expected to be limited to exposure that would occur under a future construction, industrial, and residential scenario. Intakes associated with ingestion of groundwater were evaluated using the following equation (USEPA, December 1989):

Intake = 
$$\frac{(C_w)(IR_w)(EF)(ED)}{(BW)(AT)}$$

where:

Intake = intake of chemical from groundwater (mg/kg/day)

C<sub>w</sub> = concentration of chemical in groundwater (mg/L)

 $IR_w$  = ingestion rate for groundwater (L/day)

EF = exposure frequency (days/yr)

ED = exposure duration (yr)

BW = body weight (kg)

AT = averaging time (days);

for non-carcinogens, AT = ED x 365 days/yr for carcinogens, AT = 70 yrs x 365 days/yr

USEPA standard default exposure assumptions were used to evaluate residential exposures to groundwater. The following paragraphs briefly discuss non-default receptor-specific exposure assumptions for ingestion of groundwater that were used in the HHRA.

Groundwater ingestions rates used in the previous HHRA (B&RE, January 1997) were used for the construction worker (0.05 L/hr) and industrial worker (1 L/day).

A summary of the receptor-specific input values used to estimate chemical intakes from ingestion of groundwater are presented in Table 5-33.

#### 5.2.3.5 Dermal Contact with Groundwater

Hypothetical future residential receptors were assumed to use groundwater for domestic purposes (e.g., bathing, showering, and dish washing) that can result in dermal exposure. Short-term dermal exposure was assumed to occur for the construction worker during excavation activities. Also future industrial could have contact with groundwater if groundwater was used as a potable water supply at the site. The following equation was used to assess exposures resulting from dermal contact with groundwater (USEPA, July 2004):

$$DAD = \frac{(DA_{event})(EV)(ED)(EF)(SA)}{(BW)(AT)}$$

where:

DAD = dermally absorbed dose of chemical from water (mg/kg/day)

 $DA_{event}$  = dermally absorbed dose per event (mg/cm<sup>2</sup>-event)

EV = event frequency (events/day)

ED = exposure duration (yr)

EF = exposure frequency (days/yr)

SA = skin surface area available for contact (cm<sup>2</sup>)

BW = body weight (kg)

AT = averaging time (days);

for non-carcinogens, AT = ED x 365 days/yr

for carcinogens, AT = 70 yrs x 365 days/yr

Most of the exposure assumptions used to estimate chemical intakes from dermal contact with groundwater were based on default assumptions described in standard USEPA guidance and are summarized in Table 5-33.

Dermal intakes for residents assumed total body exposure on a daily basis. For construction workers the exposed surface area of the body available for contact was based on assumed activities and was similar to the assumptions outlined for dermal contact with soil. It is assumed industrial workers only wash their hands and do not bathe or shower while at work. A value of 904 cm (assume hands are exposed) was used for the skin area available for contact by industrial workers.

The absorbed dose per event (DA<sub>event</sub>) was estimated using a non-steady-state approach for organic compounds and a traditional steady-state approach for inorganics. For organics, the following equations apply:

$$\begin{split} &\text{If } t_{\text{event}} < t^{\text{`}}, \text{ then : DA}_{\text{event}} = (2)(K_{\text{p}})(FA)(C_{\text{W}})(CF) \Bigg( \sqrt{\frac{6\,\tau\,t_{\text{event}}}{\pi}} \Bigg) \\ &\text{If } t_{\text{event}} > t^{\text{`}}, \text{ then : DA}_{\text{event}} = (K_{\text{p}})(FA)(C_{\text{W}})(CF) \Bigg( \frac{t_{\text{event}}}{1+B} + 2\,\tau \Bigg( \frac{1+3B+3B^2}{(1+B)^2} \Bigg) \Bigg) \end{split}$$

where:

 $t_{event}$  = duration of event (hour/event)

t\* = time to reach steady-state conditions (hour)

K<sub>p</sub> = permeability coefficient from water through skin (cm/hour)

FA = chemical-specific fraction absorbed (dimensionless)

C<sub>w</sub> = concentration of chemical in water (mg/L)

 $\tau$  = lag time (hour)

 $\pi$  = Pi (dimensionless; equal to 3.1416)

CF = conversion factor (0.001 L/cm<sup>3</sup>)

B = Dimensionless ratio of the permeability of the stratum corneum relative to

the permeability across the viable epidermis (dimensionless)

Values for the chemical-specific parameters (t\*,  $K_p$ , FA,  $\tau$ , and B) were obtained from the current dermal guidance (USEPA, July 2004, Exhibit B-3) and are presented in Table 5-34. If published values were not available for a particular compound, they were calculated using equations provided in the USEPA dermal guidance. While the dermal guidance provides chemical specific values for PAHs the guidance also recommends that dermal absorption of PAHs in groundwater not be evaluated quantitatively in a HHRA

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because such evaluations are outside of the effective predictive domain of the model. Therefore, no chemical-specific parameters are included in Table 5-34 for PAHs and dermal exposures to PAHs and in water were not evaluated in this HHRA.

The following steady-state equation was used to estimate DA<sub>event</sub> for inorganics:

$$DA_{event} = (K_p)(C_W)(t_{event})$$

The dermal permeability coefficient (K<sub>p</sub>) values recommended in the USEPA dermal guidance (USEPA, July 2004) were used to calculate DA<sub>event</sub> for inorganic COPCs.

#### 5.2.3.6 Inhalation of Volatiles in Groundwater

Groundwater exposure may also result in chemical intake through inhalation if the water resource is used as a domestic water supply or is exposed during construction activities and VOCs are present in the groundwater. This exposure route is plausible for residential receptors who may be exposed while showering, bathing, washing dishes, etc. and for construction workers contacting shallow groundwater during excavation activities. Chemical intakes from inhalation exposure due to the volatilization of COPCs in groundwater were estimated in the following manner (USEPA, January 2009):

$$EC = \frac{(C_{air})(ET)(EF)(ED)}{AT \times 24 \text{ hrs/day}}$$

where:

EC = exposure concentration (mg/m<sup>3</sup>)

 $C_{air}$  = concentration of chemical in air (mg/m<sup>3</sup>)

ET = exposure time (hours/day)

EF = exposure frequency (days/yr)

ED = exposure duration (yr)

AT = averaging time (days)

= for non-carcinogens, AT = ED x 365 days/yr

= for carcinogens, AT = 70 yr x 365 days/yr

For hypothetical child and adult residents, the chemical concentration in air resulting from the volatilization of COPCs during domestic groundwater use is calculated by using the following equation (USEPA, March 1991):

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$$C_{air} = (C_{gw})(K)$$

where:

 $C_{air}$  = chemical concentration in indoor air, mg/m<sup>3</sup>

C<sub>gw</sub> = chemical concentration in groundwater, mg/L

K = Volatilization Factor, L/m<sup>3</sup>

The same exposure frequencies and exposure durations used to estimate intake for dermal contact with groundwater are used to evaluate chemical intakes for inhalation of VOCs from domestic use of groundwater.

Construction workers may be exposed to COPCs that have volatilized from groundwater when excavation exposes the shallow water table. The same exposure frequency and exposure time used to estimate intake from dermal contact with groundwater were used to evaluate intake from inhalation of VOCs from groundwater during construction activities.

There are no well-established models available for estimating migration of volatiles from groundwater into a construction/utility trench. To estimate EPCs for air in a construction trench, the HHRA used an approach suggested by the Virginia Department of Environmental Quality (VDEQ, September 2012) that is based on a combination of a vadose zone model (to estimate volatilization of gases from contaminated groundwater into a trench) and a box model (to estimate dispersion of the contaminants from the air inside the trench into the above-ground atmosphere). The VDEQ methodology is described in the following paragraphs.

The airborne concentration of a contaminant in a trench can be estimated using the following equation:

$$C_{air} = C_{GW} \times VF$$

where:

 $C_{air}$  = air concentration of contaminant in the trench ( $\mu$ g/m<sup>3</sup>)

 $C_{GW}$  = concentration of contaminant in groundwater ( $\mu$ g/L)

VF = volatilization factor  $(L/m^3)$ 

It was assumed that a construction project at the Site could result in an excavation of 15 ft bgs or less. If the depth to groundwater at a site is less than 15 feet, the VDEQ model assumes that a worker would encounter groundwater when digging an excavation or a trench. The worker would then have direct

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exposure to the groundwater. The worker would also be exposed to contaminants in the air inside the trench that would result from volatilization from the groundwater pooling at the bottom of the trench.

The following equation was used to calculate the VF for a trench less than 15 ft deep:

$$VF = (Ki \times A \times F \times 10^{-3} \times 10^{4} \times 3,600) / (ACH \times V)$$

where:

Ki = overall mass transfer coefficient of contaminant (cm/s)

A = area of the trench  $(m^2)$ 

F = fraction of floor through which contaminant can enter (unitless)

ACH = air changes per hour  $(h^{-1}) = 360 h^{-1}$ 

V = volume of trench (m<sup>3</sup>)

 $10^{-3}$  = conversion factor (L/cm<sup>3</sup>)

 $10^4$  = conversion factor (cm<sup>2</sup>/m<sup>2</sup>)

3,600 = conversion factor (seconds/hour)

Studies of urban canyons suggest that if the ratio of trench width, relative to wind direction, relative to trench depth is less than or equal to 1, a circulation cell or cells will be set up within the trench that limits the degree of gas exchange with the atmosphere and, based on measured ventilation rates of buildings, the air changes per hour (ACH) is assumed to be two. Based on the ratio of trench depth to average wind speed, if the ratio of trench width to trench depth is greater than 1, the air exchange between the trench and above-ground atmosphere is not restricted, and the ACH is assumed to be 360. The exposure assessment performed for this HHRA assumed that the width-to-trench depth ratio was greater than 1; therefore, the ACH was set at 360.

K<sub>i</sub> was calculated using the following equation:

$$K_i = 1 / \{(1/k_iL) + [(RT) / (H_i k_iG)]\}$$

where:

K<sub>i</sub> = overall mass transfer coefficient of containment (cm/s)

 $k_iL$  = liquid-phase mass transfer coefficient of i (cm/s)

R = ideal gas constant (atm-m<sup>3</sup>/mole- $^{\circ}$ K) = 8.2 x 10<sup>-5</sup>

T = average system absolute temperature (°K) (Default = 298°K)

 $H_i$  = Henry's Law constant of i (atm-m<sup>3</sup>/mole)

k<sub>i</sub>G = gas-phase mass transfer coefficient of i (cm/s)

The formulas for calculating k<sub>i</sub>L and k<sub>i</sub>G are as follows:

$$k_i L = (MWO_2/MW_i)^{0.5} \times (T/298) \times kL_iO_2$$

where:

k<sub>i</sub>L = liquid-phase mass transfer coefficient of component i (cm/s)

 $MWO_2$  = molecular weight of oxygen (g/mole)

MW<sub>i</sub> = molecular weight of component i (g/mole)

kL,O<sub>2</sub> = liquid-phase mass transfer coefficient of oxygen at 25°C (cm/s) =

0002 cm/s

$$k_iG = (MWH_2O/MW_i)^{0.335} \times (T/298)^{1.005} \times kG_1H_2O$$

where:

k<sub>i</sub>G = gas-phase mass transfer coefficient of component i (cm/s)

 $MWH_2O =$  molecular weight of water (g/mole)

kG,H<sub>2</sub>O = gas-phase mass transfer coefficient of water vapor at 25°C (cm/s)=

0.833 cm/s (USEPA, 1988).

Chemical properties were obtained from the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (USEPA, December 2002) and are presented in Table 5-35.

### 5.2.3.7 Assessing Cancer Risks from Early Life Exposures

USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, March 2005) recommends making adjustments to the toxicity of carcinogenic chemicals that act via the mutagenic mode of action when evaluating early-life exposures. The guidance recommends using age-dependent adjustment factors (ADAFs) combined with age-specific exposure estimates when assessing cancer risks. In the absence of chemical-specific data, the supplement guidance recommends the following default adjustments, which reflect the fact that cancer risks are generally higher from early-life exposures than from similar exposures later in life:

- For exposures before 2 years of age (i.e., spanning a 2-year interval from the first day of birth until a child's second birthday), a 10-fold adjustment.
- For exposures between 2 and 16 years of age (i.e., spanning a 14-year time interval from a child's second birthday until their sixteenth birthday), a three-fold adjustment.
- For exposures after turning 16 years of age, no adjustment.

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The adjustments were applied using the same method as that used by ORNL in the development of RSLs. Children were evaluated as two age groups, ages 0 to 2 years and ages 2 to 6 years, and adults were evaluated as two age groups, ages 6 to 16, and ages greater than 16 years old. Using this approach, the intakes for hypothetical residents were calculated as follows:

And the intakes for adolescent trespassers were calculated as follows:

The above approach was used only for those chemicals that are identified as mutagenic in the ORNL screening table (e.g., carcinogenic PAHs, hexavalent chromium). Sample calculations showing how this approach was applied are included in Appendix F.4.

### 5.2.3.8 Summary of Exposure Parameters

A summary of exposure input parameters for all exposure pathways is presented in Table 5-33 for the identified potential receptor groups at the Site. In general, standard default parameters (e.g., USEPA, December 1989, March 1991, July 1997, and July 2004; RIDEM, November 2011), which combine midrange and upper-end exposure factors, were used in this HHRA.

### 5.3 TOXICITY ASSESSMENT

The toxicity assessment weighs the evidence regarding the potential for exposure to chemicals to produce adverse effects in exposed receptors and, when possible, the assessment estimates the relationship between the exposure to a chemical and the increased likelihood and/or severity of adverse effects. Quantitative estimates of the relationship between the magnitude and type of exposures and the severity or probability of human health effects are defined for the identified constituents of concern. Quantitative toxicity values determined during this component of the risk assessment are integrated with exposure assessment outputs to characterize the potential occurrence of adverse health effects for each receptor group.

The reference dose (RfD) is the toxicity value used to evaluate noncarcinogenic health effects for ingestion and dermal exposures. The reference concentration (RfC) is used to evaluate noncarcinogenic

health effects for inhalation exposures. The RfD and RfC estimate a daily exposure level for a human population that is unlikely to pose an appreciable risk during a portion or for all of a human lifetime. It is based on a review of animal and/or human toxicity data, with adjustments for various data uncertainties. Carcinogenic effects are quantified using the cancer slope factor (CSF) for ingestion and dermal exposures, and using inhalation unit risks (IUR) for inhalation exposure that are plausible upper-bound estimates of the probability of the development of cancer per unit intake of the chemical over a lifetime. These are typically based on dose-response data from human and/or animal studies.

### 5.3.1 Toxicity Criteria for Oral and Inhalation Exposures

Oral RfDs and CSFs and inhalation RfCs and IURs used in this HHRA were obtained from the following primary USEPA literature sources (December 2003):

- Tier 1 Integrated Risk Information System (IRIS).
- Tier 2 USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical-specific basis when requested by USEPA's Superfund program.
- Tier 3 Other Toxicity Values These sources include but are not limited to California Environmental Protection Agency (Cal EPA) toxicity values, Agency for Toxic Substances and Disease Registry (ATSDR) values, and the Annual Health Effects Assessment Summary Tables (HEAST) (USEPA, July 1997).

Although toxicity criteria can be found in several toxicological sources, USEPA's IRIS online database is the preferred source of toxicity values. This database is continuously updated, and the presented values have been verified by USEPA. The toxicity criteria for the constituents selected as COPCs are presented in Tables 5-36 through 5-39.

### 5.3.2 <u>Toxicity Criteria for Dermal Exposure</u>

RfDs and CSFs in the scientific literature are typically expressed as "administered" (i.e., not absorbed) doses. Therefore, these values are considered inappropriate for estimating risks associated with dermal exposures. Oral dose response parameters based on administered doses must be adjusted to absorbed doses before they can be compared to estimated dermal exposure intakes.

When oral absorption is essentially complete (i.e., 100 percent), an absorbed dose is equivalent to the administered dose, and therefore no toxicity adjustment is necessary. Conversely, when the gastrointestinal absorption of a chemical is poor (e.g., 1 percent), the absorbed dose is smaller than the administered dose; thus, toxicity factors based on absorbed dose should be adjusted to account for the difference in the absorbed dose relative to the administered dose. USEPA (July 2004) recommends a 50 percent absorption cut-off to reflect the intrinsic variability in analyzing absorption studies. Therefore, the adjustment from administered to absorbed dose was only performed when the chemical specific gastrointestinal absorption efficiency was less than 50 percent. The adjustment from administered to absorbed dose was made using chemical specific gastrointestinal absorption efficiencies published in numerous sources of guidance (e.g., USEPA 2004 [the primary reference], IRIS, ATSDR toxicological profiles, etc.), using the following equations:

$$RfD_{dermal} = (RfD_{oral}) (ABS_{GI})$$
  
 $CSF_{dermal} = (CSF_{oral}) / (ABS_{GI})$ 

where:  $ABS_{GI}$  = absorption efficiency in the gastrointestinal tract

 $RfD_{dermal}$  = RfD for the dermal route of exposure  $RfD_{oral}$  = RfD for the oral route of exposure  $CSF_{dermal}$  = CSF for the dermal route of exposure  $CSF_{oral}$  = CSF of the oral route of exposure

As noted above, the preceding adjustment of the oral toxicity criteria (e.g., RfDs, CSFs) was necessary to allow quantitative evaluation of the dermal route of exposure in the baseline risk assessment. An explanation of this procedure and the need for this procedure are presented in Appendix A of USEPA RAGS Part A.

### 5.3.3 <u>Toxicity of Chromium</u>

Toxicity criteria are available for different forms of chromium, which is considered to be more toxic in the hexavalent state. Because there is no evidence to support the conclusion that hexavalent chromium is present at the site, speciation analyses were not completed for samples collected at the Site. However, risks associated with this chemical were assessed by conservatively assuming that 100 percent of the reported total chromium result is attributable to hexavalent chromium.

## 5.3.4 Toxicity of PCBs

The HHRA of PCBs was conducted per the following USEPA guidance document: PCBs: Cancer Dose-Response Assessment and Application to Environmental Mixtures (USEPA, September 1996).

This guidance presents a tiered approach to the risk assessment of PCBs. A range of CSFs for PCBs is presented for use in HHRA according to criteria that consider the environmental media investigated, type of exposure, and anticipated persistence, bioaccumulation potential, and toxicity of the PCB homologues/congeners detected in the samples.

### 5.3.5 Toxicity Criteria for the Carcinogenic Effect of PAHs

Limited toxicity values are available to evaluate the carcinogenic effects from exposure to PAHs. The most extensively studied PAH is benzo(a)pyrene, which is classified by the USEPA as a probable human carcinogen. Although CSFs are available for benzo(a)pyrene, insufficient data are available to calculate CSFs for other potentially carcinogenic PAHs. Toxic effects for these chemicals were evaluated using the toxicity equivalent factors (TEFs) that relate the potency of the other potentially carcinogenic PAHs to the potency of benzo(a)pyrene, as presented in current USEPA guidance (USEPA, July 1993). The equivalent oral CSF for a carcinogenic PAH other than benzo(a)pyrene is derived by multiplying the CSF for benzo(a)pyrene by TEF recommended for that PAH. TEFs for the individual carcinogenic PAHs are as follows:

Compound	<u>TEF</u>
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1
Indeno(1,2,3-cd)pyrene	0.1

Carcinogenic PAHs acts via a mutagenic mode of action. USEPA Guidelines for Carcinogen Risk Assessment (2005a) and Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005b) specify the use of ADAFs for carcinogens that act via a mutagenic mode of action. No chemical-specific ADAF is available for carcinogenic PAHs; therefore, USEPA's default ADAFs are

applied to the carcinogenic intakes for the carcinogenic PAHs. The following default ADAFs were applied: 10 for ages 0 to 2, 3 for ages 2 to 16, and 1 (no adjustment) for ages 16 to 70.

### 5.3.6 <u>Toxicity Criteria for Trichloroethene</u>

The toxicity factors for TCE were finalized by USEPA in September 2011. TCE has toxicity factors that address both carcinogenic and noncarcinogenic effects. Toxicological studies indicated that exposure to TCE increases the risk of kidney cancer, liver cancer, and non-Hodgkin's lymphoma. There is a sufficient weight of evidence to suggest that TCE-induced kidney tumors are a result of a mutagenic mode of action. USEPA Guidelines for Carcinogen Risk Assessment (2005a) and Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005b) specify the use of ADAFs for carcinogens that act via a mutagenic mode of action. However, the ADAFs will only be applied to a portion of the cancer slope factor and inhalation unit risk that is attributable to kidney-induced tumors.

The oral CSF for TCE is  $4.6x10^{-2}$  (mg/kg-day)<sup>-1</sup> and the IUR is  $4.1x10^{-6}$  (µg/m³)<sup>-1</sup>. For the kidney mutagenic endpoint, the oral CSF is  $9.3x10^{-3}$  (mg/kg-day)<sup>-1</sup> and the IUR is  $1x10^{-6}$  (µg/m³)<sup>-1</sup>. There are no chemical-specific ADAFs for the kidney mutagenic endpoint; therefore, the USEPA's default ADAFs are applied to the carcinogenic toxicity factors for the kidney-related component of TCE's carcinogenic toxicity factors. The following default ADAFs should be applied: 10 for ages 0 to 2, 3 for ages 2 to 16, and 1 (no adjustment) for ages 16 to 70. For the liver cancer and non-Hodgkin's lymphoma endpoints, the oral CSF is  $3.7x10^{-2}$  (mg/kg-day)<sup>-1</sup> and the IUR is  $3x10^{-6}$  (µg/m³)<sup>-1</sup>. No ADAFs are applied to these values.

Noncarcinogenic effects are evaluated like all noncarcinogens in accordance with USEPA's risk assessment guidance (1989).

#### 5.4 RISK CHARACTERIZATION

This section provides a characterization of human health risks associated with potential exposures to COPCs at the Site. Potential risks (non-carcinogenic and carcinogenic) for human receptors resulting from exposures outlined in the exposure assessment were quantitatively determined and are discussed in this section. Sections 5.4.1 and 5.4.2 outline the methods used to quantitatively estimate the type and magnitude of potential risks for human receptors. Summaries of the risk characterization for the North Waterfront, Central Shipyard, Building 234, South Waterfront, and PCB Removal area are provided in Section 5.4.3.

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# 5.4.1 Quantitative Analysis of Chemicals

Quantitative estimates of risk for chemicals were calculated according to risk assessment methods outlined in USEPA guidance (USEPA, December 1989). Lifetime cancer risks are expressed in the form of dimensionless probabilities, referred to as ILCRs, based on CSFs and IURs. Non-carcinogenic risk estimates are presented in the form of HQs that are determined through a comparison of intakes with published RfDs and RfCs.

ILCR estimates for ingestion and dermal exposures were generated for each COPC using estimated exposure intakes and published CSFs, as follows:

ILCR = (Estimated Exposure Intake)(CSF)

ILCRs estimates for inhalation exposures were generated for each COPC using estimated exposure concentrations and published IURs, as follows:

ILCR = (IUR)(Exposure Concentration)(1000  $\mu$ g/mg)

An ILCR of 1x10<sup>-6</sup> indicates that the exposed receptor has an one-in-one-million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million people.

Non-carcinogenic risks were assessed using the concept of HQs and Hls. The HQ for a COPC is the ratio of the estimated intake to the RfD and is calculated for ingestion and dermal exposures as follows:

HQ = (Estimated Exposure Intake)/(RfD)

For inhalation exposures, HQ is calculated as follows:

HQ = (Exposure Concentration)/(RfC)

An HI was generated by summing the individual HQs for all COPCs. The HI is not a mathematical prediction of the severity of toxic effects and therefore is not a true "risk"; it is simply a numerical indicator of the possibility of the occurrence of noncarcinogenic (threshold) effects.

# 5.4.2 <u>Interpretation of Risk Assessment Results</u>

To interpret the quantitative risk estimates and to aid risk managers in determining the need for remediation, quantitative risk estimates were compared to typical USEPA risk benchmarks. Calculated ILCRs were interpreted using USEPA's target cancer risk range (1x10<sup>-4</sup> to 1x10<sup>-6</sup>) and RIDEM's cumulative cancer benchmark of 1x10<sup>-5</sup>. HIs were evaluated against a benchmark value of 1.

USEPA defines the range of 1x10<sup>-4</sup> to 1x10<sup>-6</sup> as the ILCR target range for hazardous waste facilities addressed under the CERCLA and the Resource Conservation Recovery Act (RCRA). Individual or cumulative ILCRs greater than 1 x 10<sup>-4</sup> are generally considered "unacceptable" by USEPA. Risk management decisions are necessary when the ILCR is within 1x10<sup>-4</sup> to 1x10<sup>-6</sup>. USEPA typically does not require remediation when the cumulative ILCR is less than 1x10<sup>-6</sup>. Similarly, cumulative ILCRs greater than 1x10<sup>-5</sup> are generally considered to be "unacceptable" by the State of Rhode Island; remediation may or may not be necessary when the cumulative ILCR exceeds 1x10<sup>-5</sup>.

A HI exceeding unity (1.0) indicates that there may be non-carcinogenic health risks associated with exposure. If a HI exceeds unity, target organ effects associated with exposure to COPCs are considered. Only those HQs for chemicals that affect the same target organ(s) or exhibit similar critical effect(s) are regarded as truly additive. Consequently, it may be possible for the cumulative HI to exceed 1.0, but no adverse health effects are anticipated if the COPCs do not affect the same target organ or exhibit the same critical effect (i.e., target-organ/critical effect-specific HIs do not exceed 1).

### 5.4.3 Results of the Risk Characterization

This section contains a summary of the results of the risk characterization for the North Waterfront, Central Shipyard, South Waterfront, former Building 234, and PCB removal area. Quantitative risk estimates for potential human receptors were developed for those chemicals identified as COPCs. The methodology used to calculate the risks presented in this section was discussed in Sections 5.2 and 5.3. Potential risks from direct contact exposures to surface soil, subsurface soil, and groundwater are discussed in Sections 5.4.4.1 through 5.4.4.10. Uncertainties associated with the risk estimates are discussed in Section 5.5.

Potential cancer risks and hazard indices were calculated for current/future adolescent and adult trespassers, current/future construction workers, current/future industrial workers, and hypothetical future child and adult residents and are summarized in Tables 5-40 through 5-44. Chemicals retained as COCs

are summarized in Tables 5-45 and 5-49. Sample calculations are presented in Appendix F.4, and the results of the risk assessment in RAGS Part D format are included in Appendix F.2.

### 5.4.3.1 Non-Carcinogenic Risks – North Waterfront

Table 5-40 presents the HIs for exposures to surface soil, subsurface soil, and groundwater at the North Waterfront. Cumulative HIs (developed on a target-organ/effect specific basis) for all receptors under current and future scenarios were less than or equal to unity (1) with the exception of hypothetical child and adult residents. The HIs of 6 for hypothetical child residents and 4 for hypothetical adult residents for exposures to groundwater exceeded the acceptable level of 1. TCE was the major contributor to the hazard index.

### 5.4.3.2 Carcinogenic Risks – North Waterfront

Table 5-40 presents the ILCRs for the North Waterfront. Cumulative ILCRs for all receptors were within the USEPA's target risk range of  $10^{-4}$  to  $10^{-6}$  with the exception of those for the hypothetical child and lifelong residents. The ILCR of  $2x10^{-4}$  for hypothetical child residents and  $2x10^{-4}$  for hypothetical lifelong residents exposed to surface soil and groundwater exceeds USEPA's target risk range. However the ILCRs for hypothetical child (ICLR =  $6x10^{-5}$ ) and lifelong residents (ICLR =  $7x10^{-5}$ ) exposed to surface soil were within USEPA's target risk range. The ILCRs of  $1x10^{-4}$  for hypothetical child and lifelong residents exposed to groundwater were equal to the upper bound of USEPA's target risk range.

Cumulative ILCRs for all receptors with the exception of hypothetical child, adult, and lifelong residents were less than RIDEM's cumulative cancer risk benchmark of 1x10<sup>-5</sup>. The ILCRs for hypothetical child residents exposed to surface soil, subsurface soil, and groundwater exceeded the RIDEM benchmark. The ILCR for hypothetical adult residents exposed to groundwater and hypothetical lifelong residents exposed to surface soil, subsurface soil, and groundwater exceeded RIDEM's cumulative cancer risk benchmark. Carcinogenic PAHs and arsenic were the major contributors to the ILCRs for exposure to surface soil and subsurface soil. TCE, vinyl chloride, and chromium were the major contributors to the ILCRs for groundwater.

### 5.4.3.3 Non-Carcinogenic Risks – Central Shipyard

Table 5-41 presents the HIs for exposures to surface soil, subsurface soil, and groundwater at the Central Shipyard. Cumulative HIs for current and future adolescent and adult trespassers and current industrial workers were less than unity (1). HIs for current/future construction workers, future industrial workers and

hypothetical child and adult residents exposed to surface soil and subsurface soil were less than unity. His for hypothetical child residents exposed to surface soil and subsurface soil were 3 and 2 respectively, although as show below, the His for the individual target organs were all less than or equal to 1.

Hypothetical Child Residents		
Tannat Onnan	Hazard Quotient	
Target Organ	Surface Soil	Subsurface Soil
Central Nervous System	0.2	0.1
Cardiovascular System	1	0.9
Gastrointestinal System	0.6	0.5
Respiratory System	0.0002	0.0002
None Reported	0.07	0.06
Skin	1	0.9
Thyroid	0.6	0.5

The HI for construction workers exposed to groundwater was 2, although as show below, the HIs for the individual target organs were all less than or equal to 1.

Future Construction Workers		
Target Organ	Hazard Quotient	
Central Nervous System	1	
Cardiovascular System	0.1	
Gastrointestinal System	0.04	
Skin	0.1	
Thyroid	0.003	
Kidney	0.009	

HIs for future industrial workers, hypothetical child residents, and hypothetical adult residents exposed to groundwater were 7, 56, and 24, respectively. Arsenic (HI = 3) and manganese (HI = 4) were the major contributors to the HI for industrial workers exposed to groundwater. Arsenic, (HI = 17), cobalt (HI = 5), iron (HI = 6), and manganese (HI = 28) were the major contributors to the HI for hypothetical child residents exposed to groundwater. Arsenic (HI = 7), cobalt (HI = 2), iron (HI = 3), and manganese (HI = 12) were also the major contributors to the HI for hypothetical adult residents exposed to groundwater.

## 5.4.3.4 Carcinogenic Risks – Central Shipyard

Table 5-41 presents the ILCRs for the Central Shipyard. Cumulative ILCRs for all receptors were within the USEPA's target risk range of  $10^{-4}$  to  $10^{-6}$  with the exception of those for the future industrial workers and hypothetical child, adult and lifelong residents. However the ILCRs for future industrial workers and hypothetical adult residents exposed to surface soil and subsurface soil and hypothetical child residents exposed to subsurface soil were within USEPA's target risk range. The ILCR of  $1 \times 10^{-4}$  for hypothetical child residents exposed to surface soil and hypothetical lifelong residents exposed to surface soil and subsurface soil was equal to the upper bound of USEPA's target risk range. The ILCRs for exposures to groundwater by future industrial workers (ILCR =  $4 \times 10^{-4}$ ), hypothetical child residents (ILCR =  $6 \times 10^{-4}$ ), hypothetical adult residents (ILCR =  $1 \times 10^{-3}$ ), and hypothetical lifelong residents (ILCR =  $2 \times 10^{-3}$ ) exceed USEPA's target risk range. Arsenic was the major contributors to the ILCRs for groundwater.

Cumulative ILCRs for current and future adolescent, adult, and lifelong trespassers, and current/future construction workers were less than RIDEM's cumulative cancer risk benchmark of 1 x 10<sup>-5</sup>. The ILCRs for current industrial workers exposed to surface soil, and future industrial workers, hypothetical child, adult, and lifelong residents exposed to surface soil, subsurface soil, and groundwater exceeded the RIDEM benchmark. Arsenic and chromium was the major contributor to the ILCRs for current and future industrial workers exposed to surface soil. Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for hypothetical child, adult, and lifelong residents exposed to surface soil and subsurface soil. Arsenic was the major contributors to the ILCRs for groundwater.

### 5.4.3.5 Non-Carcinogenic Risks – Former Building 234

Table 5-42 presents the HIs for exposures to surface soil, subsurface soil, and groundwater at former Building 234. Cumulative HIs for current and future adolescent trespassers, adult trespassers, industrial workers, and hypothetical adult residents were less than unity (1). HIs for construction workers exposed to surface soil and subsurface soil were 2 and 2 respectively, although as show below, the HIs for the individual target organs were all less than or equal to 1.

Future Construction Workers	
Target Organ	Hazard Quotient
Central Nervous System	1
Cardiovascular System	0.3
Gastrointestinal System	0.08
None Specified	0.002

Future Construction Workers	
Target Organ	Hazard Quotient
Skin	0.3
Thyroid	0.007

HIs for hypothetical child residents exposed to surface soil and subsurface soil were 3 and 3 respectively, although as shown below, the HIs for the individual target organs were all less than or equal to 1.

Hypothetical Child Residents		
Torget Organ	Hazard Quotient	
Target Organ	Surface Soil	Subsurface Soil
Central Nervous System	0.3	0.5
Cardiovascular System	0.8	1
Gastrointestinal System	0.6	0.6
Kidney	0.4	0
Respiratory System	0.0004	0.0002
None Reported	0.4	0.1
Skin	0.8	1
Thyroid	0.8	0.6

The HI for hypothetical child residents exposed to groundwater was 4. Manganese (HQ = 2) was the major contributor to the HI.

The HI for hypothetical adult residents exposed to groundwater was 2, although as show below, the HIs for the individual target organs were all less than or equal to 1.

Hypothetical Adult Residents		
Target Organ	Hazard Quotient	
Central Nervous System	0.7	
Cardiovascular System	1	
Developmental	0.2	
Gastrointestinal System	0.02	
Kidney	1	
Liver	0.9	
Skin	0.1	
Thyroid	0.2	

# 5.4.3.6 Carcinogenic Risks – Former Building 234

Table 5-42 presents the ILCRs for the former Building 234. Cumulative ILCRs for all receptors were within the USEPA's target risk range of 10<sup>-4</sup> to 10<sup>-6</sup> with the exception of those for hypothetical child and lifelong residents. The ILCR of 1x10<sup>-4</sup> for hypothetical child and lifelong residents exposed to subsurface soil was equal to the upper bound of USEPA's target risk range. The ILCRs of 3x10<sup>-4</sup> for hypothetical child residents and 4x10<sup>-4</sup> for hypothetical lifelong residents exposed to surface soil exceeds USEPA's target risk range. Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for surface soil.

Cumulative ILCRs for current and future adolescent, adult, and lifelong trespassers and current/future construction workers were less than or equal to RIDEM's cumulative cancer risk benchmark of 1x10<sup>-5</sup>. The ILCRs for current industrial workers exposed to surface soil and future industrial workers exposed to surface soil and subsurface soil exceeded the RIDEM benchmark. The ILCRs for hypothetical child, adult, and lifelong residents exposed to surface soil, subsurface soil, and groundwater exceeded the RIDEM benchmark. Arsenic and chromium were the major contributors to the ILCRs for current and future industrial workers exposed to surface soil and subsurface soil. Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for hypothetical child, adults, and lifelong residents exposed to surface soil and subsurface soil. TCE, vinyl chloride, and arsenic were the major contributors to the ILCRs for hypothetical child, adult, and lifelong residents exposed to groundwater.

### 5.4.3.7 Non-Carcinogenic Risks – South Waterfront

There are no surface soil or groundwater samples available for the South Waterfront; therefore only exposures to subsurface soils were evaluated. Receptors under current land use are only exposed to surface soil; consequently no HIs or ILCRs were calculated for these receptors at the South Waterfront. Table 5-43 presents the HIs for exposures to subsurface soil at the South Waterfront. Cumulative HIs for all receptors were less than unity (1) with the exception of the hypothetical child resident. The HI for hypothetical child residents exposed to subsurface soil was 3, although as shown below, the HIs for the individual target organs were all less than or equal to 1.

Hypothetical Child Residents	
Target Organ	Hazard Quotient
Central Nervous System	0.2
Cardiovascular System	1
Gastrointestinal System	0.8

Hypothetical Child Residents	
Target Organ	Hazard Quotient
Respiratory System	0.0004
None Reported	0.08
Skin	1
Thyroid	1

## 5.4.3.8 Carcinogenic Risks – South Waterfront

Table 5-43 presents the ILCRs for the South Waterfront. Cumulative ILCRs for all receptors were within the USEPA's target risk range of 10<sup>-4</sup> to 10<sup>-6</sup> with the exception of those for the hypothetical child and lifelong residents. The ILCR of 1x10<sup>-4</sup> for hypothetical child and lifelong residents exposed to subsurface soil were equal to the upper bound of USEPA's target risk range.

Cumulative ILCRs for future adolescent, adult, and lifelong trespassers, and current/future construction workers were less than RIDEM's cumulative cancer risk benchmark of 1x10<sup>-5</sup>. ILCRs for future industrial workers, hypothetical child, adult, and lifelong residents exceeded the RIDEM benchmark. Arsenic and chromium were the major contributor to the ILCRs for exposures to subsurface soil.

### 5.4.3.9 Non-Carcinogenic Risks – PCB Removal Area

Table 5-44 presents the HIs for exposures to surface soil and subsurface soil at the PCB removal area. No groundwater samples were collected for the PCB removal area; consequently HIs and ILCRs were not calculated for exposures to groundwater at the PCB removal area. Cumulative HIs for all receptors with the exception of current/future construction workers and hypothetical child residents were less than unity (1). The HI for current/future construction workers exposed to subsurface soil was 2, although as shown below, the HIs for the individual target organs were all less than or equal to 1.

Future Construction Workers		
Target Organ	Hazard Quotient	
Central Nervous System	1	
Cardiovascular System	0.4	
Gastrointestinal System	0.2	
Kidney	0.0002	
Respiratory System	0.2	

Future Construction Workers	
Target Organ Hazard Quotien	
Skin	0.6
Thyroid	0.02

The HI for construction workers exposed to surface soil was 1.

The HI for hypothetical child residents exposed to surface soil was 3, although as shown below, the HIs for the individual target organs were all less than or equal to 1.

Hypothetical Child Residents		
Target Organ	<b>Hazard Quotient</b>	
Central Nervous System	0.3	
Cardiovascular System	1	
Gastrointestinal System	0.6	
Kidney	0.001	
Respiratory System	0.0003	
Skin	1	
Thyroid	1	

The HI for hypothetical child residents exposed to subsurface soil was 4. Arsenic (HQ = 2) was the major contributors to the HI.

## 5.4.3.10 Carcinogenic Risks – PCB Removal Area

Table 5-44 presents the ILCRs for the PCB removal area. Cumulative ILCRs for all receptors were within the USEPA's target risk range of  $10^{-4}$  to  $10^{-6}$  with the exception of those for the hypothetical child and lifelong residents. The ILCR of  $1x10^{-4}$  for hypothetical child exposed to subsurface soil was equal to the upper bound of USEPA's target risk range. The ILCR's for hypothetical child residents exposed to surface soil (ILCR =  $5x10^{-4}$ ), and hypothetical lifelong residents exposed to surface soil (ILCR =  $2x10^{-4}$ ) exceeded USEPA's target risk range. Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for the hypothetical child and lifelong residents.

ILCRs for current adolescent, adult, and lifelong trespassers, future adult trespassers, and construction workers were less than RIDEM's cumulative cancer risk benchmark of 1x10<sup>-5</sup>. ILCRs for future adolescent and lifelong trespassers exposed to surface soil, future industrial workers and hypothetical

child, adult, and lifelong residents exposed to surface soil and subsurface soil exceed RIDEM's cumulative cancer risk benchmark. Carcinogenic PAHs and Arsenic were the major contributors to the ILCRs for exposures to surface soil. Arsenic and chromium were the major contributors to the ILCRs for future industrial workers exposed to subsurface soil. Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for hypothetical child, adult, and lifelong residents exposed to subsurface soil.

#### 5.4.3.11 Lead Risks

Lead was identified as a COPC in surface soil at Building 234. The maximum detected concentration in surface soil (189 J mg/kg) slightly exceeded the RIDEM residential DEC of 150 mg/kg but was less than OSWER soil screening level of 400 mg/kg for residential land use. Concentrations of lead only exceeded the RIDEM residential DEC in one sample. The 95% UCL of 115 mg/kg for lead is less than RIDEM residential DEC. Consequently, no adverse health effects are anticipated from residential exposures to lead in surface soil at Building 234.

### 5.4.3.12 Vapor Intrusion Risks

As discussed in Section 5.1.3 several VOCs were detected in groundwater and soil gas samples from the North Waterfront and groundwater samples at Building 234 at concentrations exceeding USEPA screening levels for VOC migration from groundwater through building foundations and into interior air. At present, there are no buildings at the North Waterfront or at former Building 234; consequently, the vapor intrusion exposure pathway is incomplete for current land use. It is possible that a building may be constructed on these areas in the future, but without knowing the details of the buildings there would be significant uncertainty associated with performing a quantitative evaluation of these areas using USEPA's Johnson and Ettinger volatilization model (2004). Instead, a semi-quantitative evaluation was conducted using USEPA's VISL Calculator (USEPA, May 2012).

The VISL Calculator is a spreadsheet tool that provides screening-level concentrations for groundwater and soil gas for default target risk levels and exposure scenarios. The VISL Calculator can assist remedial project managers in determining whether the vapor intrusion pathway has the potential to pose an unacceptable level of risk to human health by comparing subsurface and indoor air data against screening levels in the calculator.

The VISLs are calculated using the recommended approaches in existing USEPA risk assessment guidance and are based on the current understanding of the vapor intrusion pathway. Target indoor air

concentrations are calculated according to the guidance provided in Risk Assessment Guidance for Superfund (Part F) (USEPA, January 2009), which supersedes the approach that was used in USEPA's November 2002 draft vapor intrusion guidance (USEPA, 2002). The screening levels for groundwater and soil gas are calculated from the target indoor air concentrations using empirically-based conservative "generic" attenuation factors that reflect worst-case conditions. The generic VISLs are based on default exposure parameters and factors that represent RME conditions for chronic exposures. The VISL Calculator incorporates the latest toxicity values in the USEPA's RSL table and is updated as new versions are released. Hence, the calculated indoor air concentrations derived in the VISL Calculator are combined with the toxicity factors to characterize the risk. The VISL Calculator output provides the basis for this semi-guantitative screening risk evaluation for indoor air.

#### **North Waterfront**

Concentrations of TCE and vinyl chloride in groundwater samples exceeded the screening criteria for vapor intrusion (Table 5-9). Vinyl chloride was only detected in 1 of 14 groundwater samples, and TCE was detected in 8 of 14 groundwater samples. The associated chlorinated hydrocarbons, tetrachloroethene and cis- and trans -1,2-dichloroethene, were also detected. The maximum detected concentrations of these chlorinated hydrocarbons were incorporated in the VISL calculator. The residential cumulative cancer risk was  $3x10^{-5}$ , within USEPA's target risk range; however, the residential cumulative hazard index exceeded 1, primarily due to TCE. The industrial cumulative cancer risk was  $4x10^{-6}$ , within USEPA's target risk range, and the industrial cumulative hazard index was 1. The risks are presented in Table 5-45 and the VISL output is in Appendix F.5.

Concentrations of 1,3-butadiene, acrylonitrile, benzene, and TCE in soil gas samples exceeded the screening criteria for vapor intrusion (Table 5-10). 1,3-Butadiene and acrylonitrile were not detected in any surface soil, subsurface soil, or groundwater sample collected at the North Waterfront. Benzene was not detected in any groundwater sample collected at the North Waterfront. Additional chlorinated hydrocarbons were also detected in the soil gas samples. Of those chlorinated hydrocarbons that were detected in soil gas, 1,1,1-trichloroethane and 1,1-dichloroethane were not detected in groundwater.

As with groundwater, the maximum detected soil gas concentrations were incorporated in the VISL calculator. The residential cumulative cancer risk was 5x10<sup>-5</sup>, within USEPA's target risk range; however, the residential cumulative hazard index exceeded 1, primarily due to TCE. The industrial cumulative cancer risk was 9x10<sup>-6</sup>, within USEPA's target risk range, and the industrial cumulative hazard index exceeded 1, primarily due to TCE and 1,3-butadiene. The soil gas COPCs, acrylonitrile, benzene, and 1,3-butadiene were not detected in groundwater and can generally be attributed to urban air pollution. If the risks only considered chlorinated hydrocarbons, the residential cumulative cancer risk was 3x10<sup>-5</sup>,

within USEPA's target risk range; however, the residential cumulative hazard index still exceeded one. The industrial cumulative cancer risk is  $4x10^{-6}$  and the industrial cumulative hazard index is one. The risks are presented in Table 5-46 and the VISL output is in Appendix F.5.

## **Building 234**

Concentrations of TCE and vinyl chloride exceeded the screening criteria in groundwater samples collected at former Building 234 (Table 5-22). TCE and vinyl chloride were detected at maximum concentrations of 4 µg/L and 100µg/L, respectively. The associated chlorinated hydrocarbons, 1,1-dichloroethene and cis-1,2-dichloroethene, were also detected. The maximum detected concentrations of these chlorinated hydrocarbons were incorporated in the VISL calculator. The residential cumulative cancer risk was 6x10<sup>-4</sup>, greater than USEPA's target risk range, and the residential cumulative hazard index exceeded 1, primarily due to vinyl chloride. The industrial cumulative cancer risk was 4x10<sup>-5</sup>, within USEPA's target risk range, and the industrial cumulative hazard index was less than one. The risks are presented in Table 5-47 and the VISL output is in Appendix F.6.

The basis for this vapor intrusion screening risk evaluation was the use of maximum detected concentrations of contaminants in soil gas and groundwater, default exposure assumptions for reasonable maximum exposure (RME) residential and industrial exposures, and conservative attenuation factors (0.1 for soil gas to indoor air and 0.001 for groundwater to indoor air). It is evident that risks associated with vapor intrusion should be less than what was predicted in this evaluation. Based on data collected at many Navy industrial buildings, soil gas to indoor air attenuation factors typically range between 0.001 and 0.0001, thus reducing the risks associated with soil gas by a factor of more than 100. This would clearly reduce residential risks at North Waterfront to less than USEPA's target risk range and target hazard index of 1. Nonetheless, to ensure protection of human health the vapor intrusion pathway will be considered in future building construction.

### 5.4.3.13 Risk Associated With Naturally Occurring Chemicals.

As discussed in Section 5.1.2.1, chemicals detected at maximum concentrations exceeding COPC screening levels but within naturally occurring concentrations were not retained as COPCs and were not evaluated in the risk assessment presented in Sections 5.4.3.1 through 5.4.3.10. Tables 5-48 through and 5-52 present the cancer risks and hazard indices associated with these chemicals for the North Waterfront, Central Shipyard, Former Building 234, the South Waterfront, and the PCB Removal Area. RAGS Part D tables for these chemicals are presented in Appendix F.6. Also included in Tables 5-48 and 5-52 is a comparison of the cancer risks and HIs for exposures to surface soil and subsurface soil based on site-related COPCs.

HIs were less than unity for exposures to chemicals present at background concentrations for all five areas. ILCRs for all receptors exposed to chemicals present at background concentrations were less or within the USEPA target cancer risk range at all five areas. ILCRs exceeded RIDEM's acceptable risk levels for exposures to surface soil by hypothetical lifelong residents at the North Waterfront and hypothetical child and lifelong residents at the PCB Removal area. Arsenic was the major contributor to the ILCR at the North Waterfront and chromium was the major contributor to the ILCR at the PCB Removal area.

### 5.5 UNCERTAINTY ANALYSIS

This section presents a summary of uncertainties inherent in the risk assessment and includes a discussion of how they may affect the quantitative risk estimates and conclusions of the risk analysis. The baseline HHRA for the Site was performed in accordance with current USEPA guidance; however, there are varying degrees of uncertainty associated with the baseline HHRA. The following sections discuss general uncertainties in risk assessment and uncertainties specific to the risk assessment for the Site.

Uncertainty in the selection of COPCs was related to the current status of the predictive databases; the grouping of samples; the numbers, types, and distributions of samples; data quality; and the procedures used to include or exclude constituents as COPCs. Uncertainty associated with the exposure assessment included the values used as input variables for a given intake route or scenario, the assumptions made to determine EPCs, and the predictions regarding future land use and population characteristics. Uncertainty in the toxicity assessment included the quality of the existing toxicity data needed to support dose-response relationships and the weight of evidence used to determine the carcinogenicity of COPCs. Uncertainty in risk characterization is associated with exposure to multiple chemicals and the cumulative uncertainty from combining conservative assumptions made in earlier steps of the risk assessment process.

Whereas there were various sources of random uncertainty and bias, the magnitude of bias and uncertainty and the direction of bias are influenced by the assumptions made throughout the risk assessment including selection of COPCs and selection of values for dose-response relationships. Throughout the entire risk assessment, assumptions that consider safety factors were made so that the final calculated risks were overestimated.

Generally, risk assessments include two types of uncertainty, measurement and informational uncertainty. Measurement uncertainty refers to the usual variance that accompanies scientific measurements. For

example, this type of uncertainty is associated with analytical data collected for the site. The risk assessment reflects the accumulated variances of the individual values used.

Informational uncertainty stems from inadequate availability of information needed to complete the toxicity and exposure assessments. Often, this gap is significant, such as the absence of information on the effects of human exposure to low doses of a chemical, the biological mechanism of action of a chemical, or the behavior of a chemical in soil.

After the risk assessment is complete, the results must be reviewed and evaluated to identify the type and magnitude of uncertainty involved. Reliance on results from a risk assessment without consideration of uncertainties, limitations, and assumptions inherent in the process can be misleading. For example, to account for uncertainties in the development of exposure assumptions, conservative estimates were made to ensure that the particular assumptions were protective of sensitive subpopulations or the maximum exposed individuals. If a number of conservative assumptions are combined in an exposure model, the resulting calculations can propagate the uncertainties associated with those assumptions, thereby producing a much larger uncertainty for the final results. This uncertainty is biased toward over predicting both carcinogenic and non-carcinogenic risks. Thus, both the results of the risk assessment and the uncertainties associated with those results must be considered when making risk-management decisions.

This interpretation of uncertainty is especially relevant when the risks exceed the point of departure for defining "acceptable" risk. For example, when risks calculated using a high degree of uncertainty are less than an acceptable risk level (i.e., 10<sup>-6</sup>), the interpretation of no significant risk is typically straightforward. However, when risks calculated using a high degree of uncertainty exceed an acceptable risk level (i.e., 10<sup>-4</sup>), a conclusion can be difficult unless uncertainty is considered.

### 5.5.1 <u>Uncertainty in Selection of COPCs</u>

The most significant issues related to uncertainty in COPC selection at the Site are the COPC screening levels used, the absence of screening levels for a few chemicals detected in site media, and the lack of background screening. A brief discussion of each of these issues is provided in this section.

## **COPC Screening Levels**

The use of risk-based screening values based on conservative land-use scenarios (i.e., residential land use for soil and ingestion of tap water for groundwater) corresponding to ILCRs of 10<sup>-6</sup> and HIs of 0.1

ensured that all the significant contributors to risk from the site were evaluated. The elimination of chemicals present at concentrations that correspond to ILCRs less than 10<sup>-6</sup> and HIs less than 0.1 should not have affected the final conclusions of the risk assessment because those chemicals were not expected to cause a potential health concern at the detected concentrations.

### **Chemicals without Established Screening Levels**

USEPA RSLs are currently not available for some constituents detected at the Site [e.g., acenaphthylene, benzo(g,h,i)perylene, phenanthrene, and alpha- and gamma-chlordane]. For COPC screening, acenaphthene was used as a surrogate for acenaphthylene, pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene, and chlordane was selected as a surrogate for alpha- and gamma-chlordane. Applying toxicity values for one compound to another compound increases the uncertainty in the risk assessment both in regard to the selection of COPCs and the calculated risks. The direction of the uncertainty is not known.

In addition there are no USEPA RSLs of RIDEM direct contact criteria available for carbazole, creosote, and di-n-octyl phthalate. Carbazole was detected in 1 of 7 surface soil samples at the Central Shipyard. At former Building 234 carbazole was detected in 2 of 8 surface soil samples and di-n-octyl phthalate was detected 1 of 8 in surface soil samples along with elevated concentrations of PAHs, which have been identified as COCs at former Building 234. Carbazole and di-n-octyl phthalate were not detected in subsurface soil at former Building 234. The lack of risk-based screening criteria for these chemicals increases the uncertainty in the risk assessment both in regard to the selection of COPCs and the calculated risks. Although the uncertainty does not impact the conclusions of this risk assessment since these chemicals were detected infrequently and at low concentrations or they were co-located with chemicals identified as major risk drivers. Samples that were analyzed for creosote were also analyzed for PAHs, which were retained as COPCs in some areas. Consequently, the absence of screening criteria does not introduce any significant uncertainty into the risk assessment.

Also there are no USEPA SSLs or RIDEM GA leachability criteria available for carbazole, creosote, dinoctyl phthalate, dibutyltin, monobutyltin, tetrabutyltin, and tributyltin. These chemicals were not detected in groundwater samples collected at the Site indicating that carbazole, di-n-octyl phthalate, dibutyltin, monobutyltin, tetrabutyltin, and tributyltin in soil have not migrated to groundwater. Consequently, given the absence of detection of these compounds in groundwater, the HHRA conclusions are unlikely to be affected by the lack of screening levels for these chemicals. Samples that were analyzed for creosote were also analyzed for PAHs, which were identified as exceeding screening levels in some areas.

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Consequently, the absence of screening criteria does not introduce any significant uncertainty into the risk assessment.

### 5.5.2 Uncertainty in the Exposure Assessment

Uncertainty in the exposure assessment arose because of the methods used to calculate EPCs, the determination of land-use conditions, the selection of receptors and scenarios, and the selection of exposure parameters. Each of these is discussed below.

## **Exposure Point Concentrations**

Uncertainty is associated with the use of 95-percent UCLs on the mean concentration as EPCs. As a result of using 95-percent UCLs, the estimations of potential risk for the RME scenario were most likely overstated because UCLs represent the upper limit that potential receptors would be exposed to over the entire exposure period.

In cases where there were an insufficient number of samples to calculate an UCL or the UCL was greater than the maximum detected concentration, the maximum detected concentration was used as the EPC. Use of the maximum concentration tends to overestimate potential risks because receptors are assumed to be exposed continuously to the maximum concentration for the entire exposure period.

Dibenzo(a,h)anthracene was retained as a COC in surface soil at Former Building 234. Dibenzo(a,h)anthracene was detected in only 1 of 7 surface soil samples, consequently the maximum detected concentration was used as the exposure point concentration. Although the use of the maximum detected concentration as the EPC overestimates the risks associated with exposures to dibenzo(a,h)anthracene, the conclusions of the HHRA are not effect because several other carcinogenic PAHs was also retained as COCs for surface soil at Former Building 234. Carcinogenic PAHs were retained as COCs for surface soil at the PCB Removal Area. There were only four surface soils samples available for this area; therefore the maximum detected concentration was used as the EPC for carcinogenic PAHs in surface soil at the PCB Removal Area. Concentrations of carcinogenic PAHs were only elevated in one surface soil sample. Concentrations of carcinogenic PAHs in the other surface soil samples are approximately 30 times lower than the maximum detected concentrations. Consequently the use of the maximum detected concentrations likely overestimates the risks calculated for exposures to carcinogenic PAHs in surface soil at the PCB Removal Area.

The maximum detected concentration was also used as the EPC for groundwater at the North Waterfront, Central Shipyard, and Former Building 234. The use of the maximum detected concentration as the EPC in groundwater is overly conservative because the maximum detected concentrations of the COPCs do not all occur in the same well. Also groundwater is not a static medium and the concentration at a well will likely change over time. Consequently the use of the maximum detected concentrations likely overestimates the risks calculated for exposures to groundwater.

EPCs for construction workers hypothetically exposed to VOCs migrating from shallow groundwater to air were estimated using a VDEQ model for exposure of construction workers to vapors accumulating in an excavation trench. Site-specific parameters such as groundwater concentrations were used in the model. However, it was necessary to use model default values for most of the other input parameters. The use of model default values tended to increase the uncertainty in the calculated risks. The direction of the uncertainty was not known, although the model default values are generally conservative and tend to overestimate air concentrations.

#### **Land Use**

The current land-use patterns at NAVSTA Newport are well established, thereby limiting the uncertainty associated with land-use assumptions. Land use at the Site is currently limited and is expected to be limited in the future, as long as the NAVSTA Newport remains active (construction workers, industrial workers, and potential and infrequent trespassers are the only current and likely future receptors). To be conservative, risks to hypothetical residents were also estimated for the site.

# **Exposure Routes and Receptor Identification**

The determination of various receptor groups and exposure routes of potential concern was based on current land use at the site and anticipated future land use. Therefore, the uncertainty associated with the selection of exposure routes and potential receptors was minimal because they were considered to be well defined. Although industrial and residential use of groundwater was evaluated as an exposure scenario at the Site, groundwater is not currently used at the site, nor is it expected to be used in the future. Therefore, the evaluation of direct exposure to groundwater performed in this baseline HHRA was included primarily to aid in risk-management decision making.

As discussed in Section 5.1.3 several VOCs were detected in groundwater and soil gas samples from the North Waterfront and groundwater samples at Building 234 at concentrations exceeding USEPA screening levels for VOC migration from groundwater through building foundations and into interior air. At

present, there are no buildings at the North Waterfront or at former Building 234; consequently, the vapor intrusion exposure pathway is incomplete for current land use. It is possible that a building may be constructed on these areas in the future, but without knowing the details of the buildings there would be significant uncertainty associated with performing a quantitative evaluation of these areas using USEPA's Johnson and Ettinger volatilization model (2004). Instead, a semi-quantitative evaluation was conducted using USEPA's VISL Calculator (USEPA, May 2012).

### **Exposure Parameters**

Each exposure factor selected for use in the risk assessment had some associated uncertainty. Generally, exposure factors were based on surveys of physiological and lifestyle profiles across the United States. The attributes and activities studied in these surveys generally had a broad distribution. To avoid underestimation of exposure, in most cases, USEPA guidelines on the RME receptor were used, which generally specify the use of the 95<sup>th</sup> percentile value for most parameters. Therefore, the selected values for the receptors represented an upper bound of the observed or expected habits of the majority of the population.

Generally, the uncertainty can be assessed quantitatively for many assumptions made in determining factors for calculating exposures and intakes. Many of these parameters were determined from statistical analyses on human population characteristics. Often, the database used to summarize a particular exposure parameter (i.e., body weight) is quite large. Consequently, the values chosen for such variables in the RME scenario have low uncertainty.

### 5.5.3 Uncertainty in the Toxicological Evaluation

Uncertainties associated with the toxicity assessment (determination of RfDs and CSFs and use of available criteria) are discussed in this section.

### **Derivation of Toxicity Criteria**

Uncertainty associated with the toxicity assessment was associated with hazard assessment and dose-response evaluations for the COPCs. The hazard assessment characterized the nature and strength of the evidence of causation or the likelihood that a chemical that induces adverse effects in animals will also induce adverse effects in humans. Hazard assessment of carcinogenicity was evaluated as a weight-of-evidence determination using USEPA methods. Positive animal cancer test data may suggest that humans contain tissue(s) that may manifest a carcinogenic response; however, the animal

data cannot necessarily be used to predict the target tissue in humans. In the hazard assessment of noncancer effects, however, positive animal data often suggest the nature of the effects (i.e., the target tissues and type of effects) anticipated in humans.

Uncertainty in hazard assessment arose from the nature and quality of the animal and human data. Uncertainty was reduced when similar effects were observed across species, strain, sex, and exposure route; when the magnitude of the response was clearly dose-related; when pharmacokinetic data indicated a similar fate in humans and animals; when postulated mechanisms of toxicity were similar for humans and animals; and when the COPC was structurally similar to other chemicals for which the toxicity is more completely characterized.

Uncertainty in the dose-response evaluation included the determination of a CSF for the carcinogenic assessment and derivation of an RfD for the non-carcinogenic assessment. Uncertainty was introduced from interspecies (animal to human) extrapolation, which, in the absence of quantitative pharmacokinetic or mechanistic data, is usually based on consideration of interspecies differences in basal metabolic rate. Uncertainty also resulted from intraspecies variation. Most toxicity experiments are performed with animals that are very similar in age and genotype, so intragroup biological variation is minimal, but the human population of concern may reflect a great deal of heterogeneity, including unusual sensitivity or tolerance to the COPC. Even toxicity data from human occupational exposure reflect a bias because only those individuals sufficiently healthy to attend work regularly (the "healthy worker effect") and those not unusually sensitive to the chemical are likely to be occupationally exposed. Finally, uncertainty arises from the quality of the key study from which the quantitative estimate was derived and the database used.

For cancer effects, the uncertainty associated with dose-response factors was mitigated by assuming the 95-percent upper bound for the slope factor. Another source of uncertainty in carcinogenic assessment is the method by which data from high doses in animal studies are extrapolated to the dose range expected for environmentally exposed humans. The linearized multistage model, which is used in nearly all quantitative estimations of human risk from animal data, is based on a nonthreshold assumption of carcinogenesis. Evidence suggests, however, that epigenetic carcinogens, as well as many genotoxic carcinogens, have a threshold below which they are non-carcinogenic. Therefore, the use of the linearized multistage model was conservative for chemicals that exhibited a threshold for carcinogenicity.

For non-cancer effects, additional uncertainty factors may have been applied in the derivation of the RfD to mitigate poor quality of the key study or gaps in the database. Additional uncertainty for non-cancer effects arose from the use of an effect level in the estimation of an RfD, because this estimation was predicated on the assumption of a threshold less than which adverse effects were not expected.

Therefore, an uncertainty factor is usually applied to estimate a no-effect level. Additional uncertainty arose in estimation of an RfD for chronic exposure from subchronic data. Unless empirical data indicated that effects did not worsen with increasing duration of exposure, an additional uncertainty factor was applied to the no-effect level in the subchronic study. Uncertainty in the derivation of RfDs was mitigated by the use of uncertainty and modifying factors that normally ranged between 3 and 10. The resulting combination of uncertainty and modifying factors may have reached 1,000 or more.

The derivation of dermal RfDs and CSFs from oral values may have caused uncertainty. This was particularly the case when no gastrointestinal absorption rates were available in the literature or when only qualitative statements regarding absorption were available.

## **Uncertainty in the Toxicity Criteria for Chromium**

Toxicity criteria are available for different forms of chromium, which is considered to be more toxic in the hexavalent state. Although there is no evidence to support the conclusion that hexavalent chromium is present at the Site, risks associated with this chemical were assessed by conservatively assuming that 100 percent of the reported chromium result is attributable to hexavalent chromium. If chromium had been evaluated as trivalent chromium then ILCRs and HIs for chromium would be within acceptable levels and chromium would not have been retained as a COC for soil and groundwater. Also the cumulative ILCRs for exposures to groundwater at former Building 234 by hypothetical child and lifelong residents would be within USEPA acceptable levels, but still exceed the RIDEM cumulative cancer risk benchmark. Therefore, the risks calculated for chromium in soil and groundwater at the Site are likely overestimated.

### **Use of Chronic Toxicity Values for Construction Workers**

Under the guidelines established by the Superfund program, the one year exposure duration assumed for the construction worker should be evaluated as a subchronic exposure. Risks for noncarcinogenic effects associated with subchronic exposures should be developed using subchronic toxicity criteria, not chronic toxicity values. Subchronic toxicity values used in this HHRA were obtained from USEPA's PPRTV internet site if available. Also, ATSDR Minimal Risk Levels (MRLs) were used as subchronic toxicity values when subchronic PPRTV values were not available. However, subchronic toxicity values are not as widely available as chronic toxicity values (e.g., subchronic toxicity criteria are not currently available for aluminum and manganese). Therefore, chronic toxicity values were used when subchronic toxicity values were not available. This likely resulted in an overestimation of potential noncarcinogenic risks for the construction worker receptor because subchronic toxicity values may be up to an order of magnitude

higher than chronic toxicity values. Therefore, the "unacceptable HIs" identified for current/future construction workers exposed through inhalation of aluminum and manganese in fugitive dust emissions from subsurface soil at the South Waterfront and PCB removal area may actually not exceed 1. Consequently, hazard indices for current/future construction workers may be within acceptable levels at the South Waterfront and PCB removal area.

### 5.5.4 <u>Uncertainty in the Risk Characterization</u>

Uncertainty in risk characterization resulted from assumptions made regarding additivity of effects from exposure to multiple COPCs from various exposure routes. High uncertainty exists when summing non-cancer risks for several substances across different exposure pathways. This assumes that each substance has a similar effect and/or mode of action. Even when chemicals affect the same target organs, they may have different mechanisms of action or differ in their fate in the body, so additivity may not be an appropriate assumption in all cases. However, the assumption of additivity was considered because in most cases it represented a conservative estimate of risk.

Risks to any individual may also have been overestimated by summing multiple assumed exposure pathway risks for any single receptor. Although every effort was made to develop reasonable scenarios, not all individual receptors may be exposed via all pathways considered.

Finally, the risk characterization did not consider antagonistic or synergistic effects. Little or no information was available to determine the potential for antagonism or synergism for the COPCs. Because chemical-specific interactions could not be predicted, the likelihood for risks to be overpredicted or underpredicted could not be defined, but the methodology used was based on current USEPA guidance.

#### 5.6 SUMMARY

The baseline HHRA for the Former Robert E. Derecktor Shipyard at the NAVSTA Newport was conducted to characterize the potential risks to likely human receptors under current and potential future land use. This HHRA is an update of the HHRA presented in the SASE Report (B&RE, June 1997). Potential receptors under current land use are construction workers, industrial workers, and adolescent and adult trespassers. Potential receptors evaluated in the HHRA for future land use are construction workers, industrial workers, adolescent and adult trespassers, and hypothetical child and adult residents. Although future land use is likely to be the same as current land use, potential future receptors were evaluated in the baseline HHRA, primarily for decision-making purposes.

The Site was divided into five areas for the purposes of selecting COPCs; the North Waterfront, Central Shipyard, Building 234, South Waterfront, and the PCB Removal Area. Chemicals retained as COPCs are summarized in Table 5-29. PAHs and metals were retained as COPCs in soil. VOCs and metals were retained as COPCs in groundwater.

Quantitative estimates of non-carcinogenic and carcinogenic risks (HIs and ILCRs, respectively) were developed for potential human receptors. All receptors were evaluated for exposures to surface soil (0 to 2 foot bgs) and subsurface soil (> 2 ft. bgs). Current/future construction workers, future industrial workers, and hypothetical residents were also evaluated for exposures to groundwater. The results of the HHRA are summarized below. Chemicals retained as COCs are summarized in Tables 5-53 and 5-57.

### Noncarcinogenic Risks

HIs on a target organ basis for all receptors exposed to site-related COPCs in surface and subsurface soil were less than or equal to unity (1), with the exception of hypothetical child residents exposed to subsurface soil at the PCB removal area. Arsenic was the major contributor to the HI for hypothetical child residents.

HIs for all receptors exposed to site-related COPCs in groundwater were less than or equal to unity (1), with the exception of hypothetical child and adult residents at the North Waterfront, future industrial workers, hypothetical child residents, and hypothetical adult residents at the Central Shipyard and hypothetical child residents at former Building 234. TCE was the major contributor to the HI for hypothetical child and adult residents exposed to groundwater at the North Waterfront. Arsenic and manganese were the major contributors to the HI for future industrial workers exposed to groundwater at the Central Shipyard. Arsenic, cobalt, iron, and manganese were the major contributor to the HI for hypothetical child and adult residents exposed to groundwater at the Central Shipyard. Manganese were the major contributors to the HI for hypothetical child residents exposed to groundwater at former Building 234.

### **Carcinogenic Risks**

ILCRs for the following receptors/media exceed USEPA and RIDEM risk management benchmarks:

Area	Medium	ILCR Exceeds USEPA's Target Risk Range of 10 <sup>-4</sup> to 10 <sup>-6</sup>	ILCR Exceeds RIDEM's Cumulative Risk Level of 10 <sup>-5</sup>
North	Surface Soil	ILCRs within Target Risk Range	Hypothetical Child Residents
Waterfront			Hypothetical Lifelong Residents
	Subsurface	ILCRs within Target Risk Range	Hypothetical Child Residents

Area	Medium	ILCR Exceeds USEPA's Target Risk Range of 10 <sup>-4</sup> to 10 <sup>-6</sup>	ILCR Exceeds RIDEM's Cumulative Risk Level of 10 <sup>-5</sup>
	Soil		Hypothetical Lifelong Residents
	Groundwater	ILCRs within Target Risk Range	Hypothetical Child Residents
			Hypothetical Adult Residents
			Hypothetical Lifelong Residents
Central	Surface Soil	ILCRs within Target Risk Range	Current Industrial Workers
Shipyard			Future Industrial Workers
			Hypothetical Child Residents
			Hypothetical Adult Residents
			Hypothetical Lifelong Residents
	Subsurface	ILCRs within Target Risk Range	Future Industrial Workers
	Soil		Hypothetical Child Residents
			Hypothetical Adult Residents
			Hypothetical Lifelong Residents
	Groundwater	Future Industrial Workers	Future Industrial Workers
		Hypothetical Child Residents	Hypothetical Child Residents
		Hypothetical Adult Residents	Hypothetical Adult Residents
		Hypothetical Lifelong Residents	Hypothetical Lifelong Residents
Building 234	Surface Soil	Hypothetical Child Residents	Current Industrial Workers
Ü		Hypothetical Lifelong Residents	Future Industrial Workers
		,,	Hypothetical Child Residents
			Hypothetical Adult Residents
			Hypothetical Lifelong Residents
	Subsurface	ILCRs within Target Risk Range	Future Industrial Workers
	Soil	o o	Hypothetical Child Residents
			Hypothetical Adult Residents
			Hypothetical Lifelong Residents
	Groundwater	ILCRs within Target Risk Range	Future Industrial Workers
		o o	Hypothetical Child Residents
			Hypothetical Adult Residents
			Hypothetical Lifelong Residents
South	Subsurface	ILCRs within Target Risk Range	Future Industrial Workers
Waterfront	Soil		Hypothetical Child Residents
			Hypothetical Adult Residents
			Hypothetical Lifelong Residents
PCB Removal	Surface Soil	Hypothetical Child Residents	Future Adolescent Trespassers
Area		Hypothetical Lifelong Residents	Future Lifelong Trespassers
			Future Industrial Workers
			Hypothetical Child Residents
			Hypothetical Adult Residents
			Hypothetical Lifelong Residents
	Subsurface	Hypothetical Lifelong Residents	Future Industrial Workers
	Soil	<u> </u>	Hypothetical Child Residents
			Hypothetical Adult Residents
			Hypothetical Lifelong Residents

Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for surface soil at former Building 234. Carcinogenic PAHs, total Aroclors, and arsenic were the major contributors to the ILCRs for surface soil and subsurface soil at PCB removal area. Arsenic was the major contributor to the ILCRs at the Central Shipyard.

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Chromium speciation was not performed on the soil samples collected at the site, therefore, chromium was evaluated as hexavalent chromium in this HHRA. If chromium had been evaluated as trivalent chromium then ILCRs and HIs for chromium would be within acceptable levels and chromium would not have been retained as a COC for surface soil at Former Building 234 and subsurface soil at the PCB Removal Area. In addition, the cumulative ILCRs for exposures to surface soil at former Building 234 by hypothetical child and lifelong residents would be within USEPA acceptable levels, but would still exceed the RIDEM cumulative cancer risk benchmark. Cumulative ILCRs for exposures to subsurface soil at the PCB Removal Area would be equal to the upper bound of USEPA's target risk range, but would still exceed the RIDEM cumulative cancer risk benchmark.

Section 6 Addendum 1 FINAL

### 6.0 SUMMARY AND CONCLUSIONS

Section 6.0 presents a summary of activities and results of the On-Shore Derecktor Shipyard SASE Addendum investigation along with the conclusions and recommendations formulated from the investigation moving forward for this Site.

#### 6.1 OBJECTIVES

The project objectives of the SASE Addendum investigation were to collect additional environmental media samples and to obtain analytical data from areas where data gaps in media quality were identified by the Navy and regulatory agencies. This data, along with historical site data, will be used to revise the 1997 baseline HHRA and to provide recommendations for future actions at the Site.

Historical environmental media sampling efforts designed to evaluate media quality were conducted in 1996 at the Site following a sandblast grit removal action in 1995. A series of additional removal actions were completed at the Site over the period from 1997 through 2007. A review of the historic dataset for the site by the Navy and regulatory agencies determined a need for supplemental confirmatory data in areas where removal actions were conducted, and a need for data in other areas containing potential contamination.

This SASE Addendum also revises the human health risk assessment presented in the SASE using historic and new data to recalculate risks to potential human receptors.

### 6.2 FIELD INVESTIGATION

The SASE Addendum investigation was conducted in five subareas of the Site including: the Southern Waterfront, former Building 234, the Central Shipyard, the PCB Removal Area (Building 6/TP-14 Area), and the Northern Waterfront. Field activities completed as part of this investigation included the advancement of soil borings, monitoring well installation, groundwater sampling, and soil gas sampling.

Thirteen surface soil samples (included three duplicate samples), 11 subsurface soil samples, 14 groundwater samples (including two duplicates), and five soil gas samples (including 1 duplicate) were collected for laboratory analysis and reporting. Laboratory analysis was sample specific but included VOCs, DRO/GRO, PAHs, PCBs, and metals.

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### 6.3 NATURE AND EXTENT OF CONTAMINATION

This report summarizes environmental media quality data collected as part of the 2011 SASE Addendum investigation at the Site. Analytical data from previous investigatory efforts at the Site are provided in the 1997 SASE report included as Appendix E-6 of this report.

Contaminant-specific concentrations were compared to PALs established in the Work Plan Addendum. PALs for soil consisted of the lowest of the USEPA RSLs (2010) and the RIDEM Residential Soil DEC. PALs for groundwater consisted of the lowest of USEPA MCL and the RIDEM GA groundwater aquifer criteria. PALs for soil gas were derived from USEPA residential air RSLs adjusted by an attenuation factor of 0.1 for shallow soil gas and 0.01 for deep soil gas.

### Southern Waterfront Area

Exceedances of the USEPA RSL screening criteria for 6 metals were identified in subsurface soil samples at the Site. Although metals in subsurface soil exceed the USEPA RSL, it is possible that the exceedances of some or all of the metals may be due to the generally elevated background levels of metals found in Newport soils.

### Building 234

Analytical results from the groundwater sample MW08 collected in this area did not contain any VOCs, PAHs, or metals above regulatory comparison criteria. Exploratory borings conducted at Sump 234-4 confirmed a concrete bottom and therefore no soil samples for laboratory analysis and reporting were collected.

#### Central Shipyard

Analytical results from two groundwater samples (MW218 and MW219) did not identify any VOCs or PAHs above regulatory comparison criteria. Arsenic was the only metal detected in groundwater at a concentration exceeding the MCL. The high concentrations of arsenic may be attributable to naturally high background levels of arsenic in Newport soils.

The Central Shipyard was the location of temporary USMC office trailers, were removed in 2012. As part of the removal process utilities associated with the trailers, including buried electrical conduits, water line, septic tank and piping were removed for off-site disposal. The Final Site Clean Up document for this effort is provided in Appendix H.

### PCB Removal Area

Elevated concentrations of PAHs (with eight compounds exceeding criteria) and metals (with six constituents exceeding RSLs) were detected in surface soil samples collected from the PCB Removal Area. SB209 contained concentrations of aroclor-1260 exceeding regulatory comparison criteria. In subsurface soil samples, slightly elevated concentrations of PAHs (with four PAHs exceeding criteria) and metals (with six metals exceeding criteria) were detected. Analytical results from four surface soil samples (SB215, SB216, SB217, and SB224) collected in the former transformer bank area did not detect PCBs above the laboratory instruments method detection limits. The distribution of contaminants suggests that the 1999 removal action conducted in this area adequately addressed PCB contamination. A sample located in an area receiving surface water runoff from a section of the Penn-Central Railway contained metals above criteria.

### Northern Waterfront

### Huts 1 and 2

Elevated concentrations of PAHs (with four compounds exceeding criteria) and metals (with seven constituents exceeding criteria) were detected in surface soil samples. In subsurface soil samples, elevated concentrations of PAHs (with two compounds exceeding RSLs) and metals with (four individual constituents exceeding RSLs) in subsurface soil samples collected from the Huts 1 and 2 area. A groundwater sample (MW204) collected in this area did not identify any contaminants above regulatory comparison criteria (VOCs and metals) or above the laboratory instruments method detection limits (PAHs).

Contaminants detected at this subarea of the Site are consistent with historical operations and activities that were conducted in this area, including vehicle maintenance. Groundwater quality results indicate that no contaminants are leaching into the overburden groundwater aquifer. This area was the site of a satellite parking lot construction project and several sample locations may have subsequently been covered by bituminous concrete paving. The former building concrete pad for Huts 1 and 2 has been demolished and removed under a previous action by the Navy.

### Groundwater

Eight groundwater monitoring wells were sampled in the Northern Waterfront Area. One VOC, TCE, was detected above regulatory comparison criteria in five of the eight groundwater samples. A comparison to the 1997 SASE groundwater analytical results indicated that VOC concentrations are lower in the 2011 sampling event than in historical sampling events. TCE is most likely the result of limited spills in former storage areas and maintenance areas that have had limited impact on the overburden groundwater aquifer.

### Soil Gas

Elevated concentrations of five VOCs (1,3-butadiene, acrylonitrile, benzene, tetrachloroethene, and TCE) were found in soil gas samples at concentrations exceeding USEPA comparison criteria. To ensure protection of human health, the vapor intrusion pathway will be considered in future building construction.

### 6.4 HUMAN HEALTH RISK ASSESSMENT

The HHRA completed in this SASE Addendum calculated risk for each of the five areas of the Site. Soil, groundwater, and soil gas analytical results from the historic and recent sampling events were used in the HHRA. Risk was evaluated for receptor exposure under residential and non-residential (industrial, commercial, and recreational) land use scenarios. The dataset used in the HHRA included groundwater and soil gas data from 2011; and soil data from 1996, 2011, and removal action confirmation samples.

Potential receptors under current land use are construction workers, industrial workers, and adolescent and adult trespassers. Potential receptors evaluated in the HHRA for future land use are construction workers, industrial workers, adolescent and adult trespassers, and hypothetical child and adult residents. Although future land use is likely to be the same as current land use, potential future receptors were evaluated in the baseline HHRA, primarily for decision-making purposes.

The Site was divided into five areas for the purposes of selecting COPCs; the North Waterfront, Central Shipyard, Building 234, South Waterfront, and the Building 6/Test Pit 14 PCB Removal area. PAHs and metals were retained as COPCs in soil. VOCs and metals were retained as COPCs in groundwater.

Quantitative estimates of non-carcinogenic and carcinogenic risks (HIs and ILCRs, respectively) were developed for potential human receptors. All receptors were evaluated for exposures to surface soil (0 to 2 foot bgs) and subsurface soil (> 2 ft. bgs). Current/future construction workers, future industrial workers, and hypothetical residents were also evaluated for exposures to groundwater.

### Noncarcinogenic Risks

Arsenic was the major contributor to the HI for hypothetical child residents exposed to subsurface soil at the PCB removal area.

TCE was the major contributor to the HI for hypothetical child and adult residents exposed to groundwater at the North Waterfront. Manganese was the major contributor to the HI for future industrial workers exposed to groundwater at the Central Shipyard. Arsenic, cobalt, iron, and manganese were the major contributors to the HI for hypothetical child and adult residents exposed to groundwater at the Central

Shipyard. Manganese was the major contributor to the HI for hypothetical child residents exposed to groundwater at former Building 234.

### **Carcinogenic Risks**

Cancer risks exceeding USEPA cancer risk range (10<sup>-4</sup> to 10<sup>-6</sup>) was determined for hypothetical residents in one area for groundwater and in two areas for soil. In addition, cancer risks exceeding the RIDEM cancer risk threshold of 10<sup>-5</sup> was determined for hypothetical receptors in each area and for current industrial workers in two areas and future industrial workers in three areas, and future trespassers in the PCB Removal Area.

The following table summarizes carcinogenic risks that exceed the USEPA cancer target risk range.

Area	Medium	Receptor	Contaminant Contributing to Cancer Risk
Central Shipyard	Groundwater	Future Industrial Workers (2E-04) Hypothetical Child Residents (6E-04) Hypothetical Adult Residents (1E-03) Hypothetical Lifelong Residents (2E-03)	Arsenic
Building 234	Surface Soil	Hypothetical Child Residents (3E-04) Hypothetical Lifelong Residents (4E-04)	PAHs, arsenic, chromium
PCB Removal Area	Surface Soil	Hypothetical Child Residents (5E-04) Hypothetical Lifelong Residents (5E-04)	PAHs, arsenic
	Subsurface Soil	Hypothetical Lifelong Residents (2E- 04)	PAHs, arsenic, chromium

Chromium speciation was not performed on the soil and groundwater samples; therefore chromium was evaluated as hexavalent chromium in the HHRA. If chromium had been evaluated as trivalent chromium then all risks from chromium would have been within USEPA and RIDEM acceptable levels.

#### 6.5 RECOMMENDATIONS

The On-Shore Derecktor Site is currently located on an active portion of NAVSTA Newport. Several construction projects are being conducted at the site to improve the site for future Navy and USCG use. Future land use will not include residential use due to the industrial nature of the site and the on-going Navy infrastructure constructions plans.

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The conclusions of the risk assessment determined that risk under the residential use scenario is present for soil and groundwater. Risk under the future industrial user scenario is present due to inadvertent ingestion of groundwater containing arsenic and manganese. Several removal actions have been conducted at the site to remove sources of contamination present from previous site uses.

This SASE addendum fulfills the role of a Remedial Investigation for this site because this report, coupled with the previous SASE report, contains the risk assessment component required by CERCLA. Based on the risks estimated for the residential and industrial workers scenarios, it is recommended that the Site be carried forward to a Feasibility Study (FS) step which will evaluate remedial alternatives for soil and groundwater.



# TABLE 3-1 SOIL BORING SAMPLE SUMMARY FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RI PAGE 1 OF 2

LOCATION	DEPTH INTERVAL (FT)	PID READING (ppmv)	COMMENTS	SAMPLE ID	SAMPLE DATE	SAMPLE TIME
SB201	0-2	0.1				
	2-4	0.6	HSA Sample collected	DSY-SB201-SO-204	2/11/2011	0835
	4-6	0.2	·			
	6-8	0.1				
	8-10	0.5				
	10-12	0.0				
	12-14	0.1				
	14-16	0.4				
	16-18	0.3				
SB202	0-2	0.4				
	2-4	0.3	HSA Sample collected	DSY-SB202-SO-204	2/9/2011	1345
	4-6	0.3	·			
	6-8	0.1				
	8-10	0.1				
	10-12	0.1				
	12-14	0.2				
	14-16	0.0				
	16-18	0.2				
SB203	0-1	NR				
	2-4	NR				
	4-5	NR				
SB204	0-2	0.1	HSA Sample collected at surface	DSY-SB204-SO-0002	2/11/2011	1400
0220.	2-4	0.5	The transport of the tr	201 02201 00 0002	2/11/2011	1100
	4-6	0.1				
	6-8	0.1				
	8-10	0.4	HSA Sample collected	DSY-SB204-SO-0810	2/11/2011	1210
	10-12	0.2	The transplacements	201 02201 00 0010	2/11/2011	1210
	12-14	0.5				
	14-16	0.1				
	16-18	0.0				
SB205	0-2		HSA Sample collected at surface	DSY-SB205-SO-0002	2/15/2011	1210
35200	2-4	0.2		DO1-0D200-0002	2/10/2011	1210
	4-6	0.3				
	6-8	0.3				
	8-10	0.2	HSA Sample collected	DSY-SB205-SO-0809	2/15/2011	1230
	10-12	0.2	1107 Campio collected	DO1-0D200-00-0009	2/13/2011	1230
	12-14	0.2				+
	14-16	0.3				+
	16-16.4	NR				

# TABLE 3-1 SOIL BORING SAMPLE SUMMARY FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RI PAGE 2 OF 2

LOCATION	DEPTH INTERVAL (FT)	PID READING (ppmv)	COMMENTS	SAMPLE ID	SAMPLE DATE	SAMPLE TIME
SB206	0-1	0.0	HSA Sample collected at surface	DSY-SB206-SO-0002	2/14/2011	1430
	2-4	NR				
	4-6	0.0				
	6-8	0.0				
	8-10	0.1	HSA Sample collected	DSY-SB206-SO-0810	2/14/2011	1455
	10-12	0.0				
	12-14	0.1				
SB207	0-1	0.1	HSA Sample collected at surface	DSY-SB207-SO-0002	2/15/2011	0905
	2-4	0.0				
	4-6	0.0				
	6-8	0.0				
	8-10	0.1				
	10-12	0.1	HSA Sample collected	DSY-SB207-SO-1012	2/15/2011	0935
	12-14	0.1				
SB208	0-0.5	NR	Hand auger Sample collected at surface	DSY-SO-SB208-000.5	2/25/2011	1405
SB209	0.3-0.7	NR	DPT Sample collected at surface below asphalt layer	DSY-SO-SB209-0.30.7	2/25/2011	1005
SB210	0102	NR	DPT Sample collected at surface	DSY-SO-SB210-0102	2/25/2011	1235
SB211	0102	NR	DPT Sample collected at surface	DSY-SO-SB210-0102	2/25/2011	1335
SB212	0002	NR	·			
	0204	NR	DPT Sample collected	DSY-SO-SB212-0204	2/25/2011	1500
SB213	0002	NR				
	0203	NR	DPT Sample collected	DSY-SO-SB213-0203	2/25/2011	1325
SB214	0002	NR				
	0203	NR	DPT Sample collected	DSY-SO-SB214-0203	2/25/2011	1340
SB215	0-0.5	NR	HSA Sample collected at surface	DSY-SO-SB215-000.5	2/22/2011	1500
SB216	0-0.5	NR	HSA Sample collected at surface	DSY-SO-SB216-000.5	2/22/2011	1535
SB217	0-0.5	NR	HSA Sample collected at surface	DSY-SO-SB217-000.5	2/22/2011	1540
SB224	0-0.5	NR	HSA Sample collected at surface	DSY-SO-SB224-000.5	2/22/2011	1600

HSA: hollow stem auger DPT: direct puch technology

### TABLE 3-2 SAMPLE LOCATION SUMMARY FORMER ROBERT E. DERECKTOR NAVSTA NEWPORT, NEWPORT, RI PAGE 1 OF 2

SAMPLE LOCATION ID	LOCATION	WELL SCREEN INTERVAL (Ft BTOR)	JUSTIFICATION
Borings			
SB201	Southern Waterfront Area	NA	To investigate potential PAH or metals contamination in Section 6 of the Southern Waterfront area
SB202	Southern Waterfront Area	NA	To investigate potential PAH or metals contamination in Section 6 of the Southern Waterfront area
SB203	Sump 234-4	NA	To investigate potential contamination in the bottom of former sump 234-4
SB204	Huts 1 and 2	NA	To investigate potential soil and groundwater contamination in the vicinity of TP-16 and TP-27
SB205	Huts 1 and 2	NA	To investigate potential soil contamination in the vicinity of TP-16
SB206	Huts 1 and 2	NA	To investigate potential soil contamination in the vicinity of TP-16
SB207	Huts 1 and 2	NA	To investigate potential soil contamination in the vicinity of TP-16
SB208	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB209	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB210	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB211	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB212	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB213	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB214	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB215	Building 6/TP-14 Area (Transformer Bank)	NA	To investigate potential PCB soil contamination beneath the gravel layer in the transformer bank area
SB216	Building 6/TP-14 Area (Transformer Bank)	NA	To investigate potential PCB soil contamination beneath the gravel layer in the transformer bank area
SB217	Building 6/TP-14 Area (Transformer Bank)	NA	To investigate potential PCB soil contamination beneath the gravel layer in the transformer bank area
SB224	Building 6/TP-14 Area (Transformer Bank)	NA	To investigate potential PCB soil contamination beneath the gravel layer in the transformer bank area

### **TABLE 3-2 SAMPLE LOCATION SUMMARY FORMER ROBERT E. DERECKTOR NAVSTA NEWPORT, NEWPORT, RI** PAGE 2 OF 2

SAMPLE LOCATION ID	LOCATION	WELL SCREEN INTERVAL (Ft BTOR)	JUSTIFICATION
Monitoring Wells			
MW08 (existing well)	Northeast of former Building 234 in area of former USTs and former machine shop	6.05 – 11.05	To investigate potential impact from former USTs and machine shop to shallow overburden aquifer (area of TP-26)
MW218	Building 42	10 - 20	To investigate potential contamination in shallow overburden groundwater downgradient of TP- 25
MW219	Building 42	10 - 20	To investigate potential contamination in shallow overburden groundwater downgradient of sump S42-1
MW02A (replacement well)	Northern Waterfront Area (West of former oil discharge area)	16 - 26	To investigate potential groundwater contamination in the vicinity of areas of former oil discharges to soil and groundwater
MW03 (existing well)	Northern Waterfront Area (former Hazardous Waste Storage Area)	5.79 – 15.79	Assess impacts of hazardous waste storage area on deep portions of soil and groundwater
MW11A (replacement well)	Northern Waterfront Area (Between Pier 2 and the Former Hazardous Waste Storage Area)	5 - 10	Assess impacts of former storage areas and other disposal on deep portions of overburden aquifer
MW12 (existing well)	Northern Waterfront Area (Between Pier 1 and the Former Hazardous Waste Storage Area)	15 - 25	Assess impacts of former storage areas and other disposal on deep portions of overburden aquifer
MW204	Huts 1 and 2	8 - 18	To investigate potential groundwater contamination in the vicinity of TP-16 and TP-17.
MW220	Northern Waterfront Area	5 - 20	To investigate potential groundwater contamination downgradient of the former hazardous waste storage area
MW221	Northern Waterfront Area	3 - 15	To investigate potential groundwater contamination downgradient of the former hazardous waste storage area
MW222	Northern Waterfront Area	4 - 14	To investigate potential groundwater contamination in the central portion of the Northern Waterfront Area
MW223	Northern Waterfront Area (Upgradient location)	41 - 51	To provide an upgradient/background groundwater data point
Soil Gas			
SG-MW02A	Northern Waterfront Area	7 – 8*	Co-located with existing groundwater monitoring well MW02, to assess potential presence of VOCs in soil gas
SG-MW12	Northern Waterfront Area	5-6*	Co-located with existing groundwater monitoring well MW12, to assess potential presence of VOCs in soil gas
SG-MW03	Northern Waterfront Area	6.5 – 8*	Co-located with existing groundwater monitoring well MW03, to assess potential presence of VOCs in soil gas
SG-MW11	Northern Waterfront Area	2-3*	Co-located with previous existing groundwater monitoring well MW11(destroyed), to assess potential presence of VOCs in soil gas

NA = not applicable
--- monitoring wells could not be located during the February March sample round.
\* Soil Gas "screen interval measurements" reflect distance from top of probe to bottom of probe (ft bgs).

## TABLE 3-3 MONITORING WELL CONSTRUCTION DETAILS SUMMARY FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RI

LOCATION	WELL TYPE	DIAMETER (inches)	SCREENED INTERVAL	NORTHING*	EASTING*	TOP CASE ELEVATION	TOP RISER ELEVATION	GROUND ELEVATION
DSY-MW219	Overburden	2	10 -20	161155.86	379641.84	16.98	16.77	14.1
DSY-MW08 (existing)	Overburden	2	6.05 - 11.05	160822.44	379991.86	11.60	11.13	11.1
DSY-MW2A	Overburden	2	16 - 26	161948.08	379410.23	12.97	12.87	10.1
DSY-MW223	Bedrock	2	41 - 51	162730.29	379643.75	48.82	48.30	48.3
DSY-MW204	Overburden	2	8 - 18	161829.14	379641.02	12.38	12.03	12.0
DSY-MW218	Overburden	2	10 - 20	161532.84	379577.95	16.95	16.67	13.8
DSY-MW220	Overburden	2	5 -20	162294.72	379304.57	9.97	9.62	9.6
DSY-MW221	Overburden	2	3 - 15	162438.96	379372.49	10.54	10.14	10.1
DSY-MW12 (existing)	Overburden	2	15 - 25	162318.64	379382.82	10.69	10.28	10.3
DSY-MW03 (existing)	Overburden	2	5.79 - 15.79	162472.23	379433.81	11.82	11.30	11.3
DSY-MW11A	Overburden	2	5 - 10	162882.04	379225.08			10.2
DSY-MW222	Overburden	2	4 -14	162645.56	379356.34	10.92	10.53	10.5

Vertical control datum : NGVD 1929 MSL Horizontal control datum: NAD 1983 (1986)

MW11A was a temporary monitoring well and was not present at the time of surveying. Northing and easting coordinates are for the co-located soil gas sample location.

## TABLE 3-4 MONITORING WELL DEVELOPMENT STABILIZATION SUMMARY FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RI

WELL ID	DEVELOPMENT DATE	SCREENED INTERVAL (bgs)	PUMP TYPE	INITIAL CLOCK TIME	FINAL CLOCK TIME		CUM. VOLUME PURGED (L)	TEMP (C°)	SPEC COND (µS/cm)	РН	TURBIDITY (NTU)	COMMENTS
MW219	3/7/2011	10 -20	waterra	0915	1315	15.33	405	8.80	0.695	9.92	437	
MW08	2/15/2011	6.05 - 11.05	waterra	0925	1310	7.28	245.5	7.10	1.044	6.28	202	
MW2A	2/16/2011	16 - 26	waterra	1135	1520	12.05	462.95	9.41	1.074	7.97	85.1	
MW223	3/8/2011	41 - 51	waterra	0855	1255	12.78	550.5	14.30	0.311	6.73	87.6	
MW204	3/7/2011	8 - 18	waterra	1353	1753	10.71	526.5	9.10	0.466	6.02	NR	
MW218	2/16/2011	10 - 20	waterra	0905	1700	15.20	1294	12.00	1.099	6.69	12.3	
MW220	2/17/2011	5 -20	waterra	0911	1259	8.50	228	NR	NR	NR	NR	
MW221	2/18/2011	3 - 15	waterra	0942	1342	7.64	324.9	12.00	0.514	6.17	1456	
MW12	2/17/2011	15 - 25	waterra	0929	1314	8.86	392.8	12.30	0.612	7.25	220	hard bottom
MW03	2/14/2011	5.79 - 15.79	waterra	1149	1542	11.62	345.2	10.60	0.402	5.81	246	
MW11A	NA	5 - 10	NA	NA	NA	6.11	NA	NA	NA	NA	NA	Temporary well
MW222	2/22/2011	4 -14	waterra	0747	1147	5.85	285.3	6.60	0.821	7.54	NR	

NR = Not Recorded

# TABLE 3-5 MONITORING WELL SAMPLE PURGE STABILIZATION SUMMARY FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RI PAGE 1 OF 2

WELL ID	DATE	START TIME	FINAL READ- ING TIMES	WATER DEPTH	PURGE RATE (ml/min)	CUM. VOLUME PURGED (L)	TEMP (C°)	SPECIFIC COND. (mS/cm)	DO (mg/L)	PH	ORP (mV)	SALINITY (ppth)	TURBIDITY (NTU)	COMMENTS
MW02A	2/24/2011	0951	1200	11.45	150	22.78	12	0.806	0.22	8.58	-134.10	0.40	2.76	
			1206	11.45	150		12.1	0.805	0.22	8.58	-140.10	0.40	2.96	
			1210	11.45	150		11.9	0.808	0.24	8.57	-144.5	0.40	2.35	
MW03	2/24/2011	1346	1456	7.43	240	18.415	11.3	0.436	4.12	5.49	48.6	0.21	2.56	
			1500	7.43	240		11.2	0.436	4.11	5.49	50.8	0.21	3.09	
			1505	7.43	240		11.2	0.435	4.10	5.49	52.4	0.21	2.38	
MW08	3/1/2011	1027	1117	7.09	100	6	8.2	896	0.40	6.30	92.1	0.44	6.79	
			1122	7.10	100		8.2	896	0.43	6.30	92.3	0.44	4.06	
			1127	7.11	100		8.2	895	0.43	6.30	92.7	0.44	3.75	
MW11A	2/26/2011	1119	12.54	6.74	225	23.65	12.9	0.534	0.34	6.60	-173.5	0.26	9.31	
			12.59	6.74	225		13.0	0.530	0.34	6.59	-172.1	0.26	8.73	
			13.04	6.74	225	1	12.9	0.530	0.35	6.56	-169.9	0.26	7.36	
MW12	3/3/2011	1150	1410	8.35	225	33.75	10.7	0.628	0.21	7.96	-9.8	0.31	3.39	
			1415	8.35	225		10.8	0.628	0.21	7.96	-14.6	0.31	4.13	
			1420	8.35	225		10.9	0.628	0.27	7.96	-18.8	0.31	3.09	
MW204	3/17/2011	0916	1032	10.60	130	11.96	10.3	485.9	2.54	6.11	205.1	NR	16	
			1044	10.60	130		10.5	486.2	2.50	6.08	204.0	NR	16	
			1048	10.60	130		10.5	487.0	2.47	6.08	203.7	NR	15	
MW218	3/1/2011	1257	1347	14.97	250	15.25	10.2	0.854	0.24	6.47	17.0	0.42	13.8	
			1352	14.98	250		10.2	0.856	0.25	6.47	12.1	0.42	13.6	
			1357	14.99	250		10.2	0.864	0.27	6.48	7.7	0.43	13.0	
MW219	3/16/2011	0852	1000	14.94	130	10.43	8.7	707.7	0.24	6.99	-108.5	NR	18	
			1005	14.94	130		8.7	707.6	0.25	7.00	-109.3	NR	17	
			1010	14.94	130		8.6	706.9	0.29	7.00	-109.4	NR	15	
MW220	3/1/2011	1015	1130	8.45	200	16.375	9.0	5.687	1.11	7.25	-80.1	3.09	4.84	
			1135	8.46	200		9.0	5.675	0.97	7.25	-84.5	3.08	3.29	
			1140	8.46	200		9.1	5.651	0.98	7.26	-88.9	3.07	3.15	
MW221	3/2/2011	1249	1324	7.15	225	9.875	9.7	0.606	0.86	5.92	148.6	0.30	1.66	
			1329	7.15	200		9.5	0.602	0.85	5.91	146.9	0.29	0.86	
			1334	7.15	200		9.6	0.594	0.84	5.90	144.9	0.29	0.86	

# TABLE 3-5 MONITORING WELL SAMPLE PURGE STABILIZATION SUMMARY FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RI PAGE 2 OF 2

WELL ID	DATE	START TIME	FINAL READ- ING TIMES	WATER DEPTH	RATE	CUM. VOLUME PURGED (L)	TEMP (C°)	SPECIFIC COND. (mS/cm)	DO (mg/L)	РН	ORP (mV)	SALINITY (ppth)	TURBIDITY (NTU)	COMMENTS
MW222	3/2/2001	1012	1102	5.10	250	17	7.1	1.056	6.46	7.37	143.4	0.53	14.30	
			1107	5.10	250		7.1	1.061	6.41	7.35	139.0	0.53	15.00	
			1112	5.10	250		7.1	1.057	6.40	7.39	133.9	0.52	14.20	
MW223	3/16/2011	1446	1329	11.98	100	20	12.3	323.6	0.36	6.80	-49.4	0.36	55.00	
			1334	11.98	100		12.2	327.0	0.30	6.81	-52.5	0.30	55.00	
			1338	11.98	100		12.1	326.1	0.29	6.81	-57.7	0.29	50.00	

NR = not recorded

## TABLE 3-6 SOIL GAS SAMPLE COLLECTION SUMMARY FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RI

WELL ID	COLLECTION DATE	SAMPLE COLLECTION TIME	FINAL PRESSURE (IN. HG)	SAMPLE DEPTH (FT BGS)	COMMENTS
DSY-SG-MW02A	2/24/2011	1105 - 1145	- 2	7 - 8	None
DSY-SG-MW03/DUP01	2/24/2011	1530 - 1605	- 4	6.5 - 8	None
DSY-SG-MW11A	3/3/2011	1220 - 1250	-7.5	2-3	A shallow sample was collected due to the presence of a high water table
DSY-SG-MW12	3/3/2011	1519 - 1549	-7	5 - 6	None

# TABLE 4-1 ANALYTICAL RESULTS - SURFACE SOIL ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

SAMPLE ID				DSY-SB204-	DSY-SB204-	DSY-SB204-	DSY-SB205-	DSY-SB206-	DSY-SB207-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-SB216	DSY-SO-SB217	IDSY-SO-	DSY-SO-SB224-	DSY-SO-
	1			SO-0002	SO-0002-D	SO-0002-AVG		SO-0002	SO-0002	SB208-000.5	SB208-000.5-D		SB209-0.30.7	SB215-000.5		000.5	SB224-000.5	000.5-D	SB224-000.5-
												AVG							AVG
TARGET AREA				HUTS 1	HUTS 1	HUTS 1 AND	HUTS 1	HUTS 1	HUTS 1	BLDG. 6 - TP-	BLDG. 6 - TP-14	BLDG. 6 - TP-							
				AND 2	AND 2	2	AND 2	AND 2	AND 2	14 AREA	AREA	14 AREA							
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209	DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.3 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH				2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT	0.5 FT	0.5 FT				
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM	NM	FD	NM
VOLATILES (UG/KG)																			
2-BUTANONE	2800000	10000000	2800000	5.52 U	3.26 J	3.01 J	5.43 U	3.92 U	4.17 U	NA	. NA	NA NA	NA	NA	NA	NA	NA NA	NA NA	NA NA
2-HEXANONE	21000		21000	2.76 U	4.96 J	3.17 J	2.72 U	1.96 U	2.09 U	NA	. NA	NA NA	NA	NA	NA	NA	NA NA	NA NA	NA NA
ACETONE	6100000	7800000	6100000	11 UJ	31.4 J	18.4 J	27.3 J	9.96 J	16.5 J	NA	. NA	NA NA	NA	NA	NA	NA	NA NA	NA NA	NA NA
CARBON DISULFIDE	82000		82000	2.76 U	2.5 U	2.63 U	3.28 J	1.96 U	2.09 U	NA	. NA	NA NA	NA	NA	NA	NA	NA NA	NA NA	NA NA
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG)																			
2-METHYLNAPHTHALENE	31000	123000	31000	18 U	17.9 U	18 U	18.9 U	3.56 U	14.5 J	33.1 J	18.8 J	26 J	299	NA	NA	NA	NA NA	NA NA	NA NA
ACENAPHTHENE	340000	43000	43000	18 U	17.9 U	18 U	17.8 J	3.56 U	17.2 U	36.7 J	10 J	23.4 J	1000	NA	NA	NA	NA NA	NA NA	
ACENAPHTHYLENE	340000	23000	23000	18 U	17.9 U	18 U	19.9 J	3.56 U	17.2 U	3.97 U	3.94 U	3.96 U	695	NA	NA	NA	NA NA	NA NA	NA NA
ANTHRACENE	1700000	35000	35000	18 U	17.9 U	18 U	51.1	3.56 U	17.2 U	45.1 J	3.94 UJ	23.5 J	2290	NA	NA	NA	NA NA	NA NA	NA NA
BENZO(A)ANTHRACENE	150	900	150	22.5 J	17.9 UJ	15.7 J	232 J	3.56 UJ	31.8 J	149 J	51.5 J	100 J	5740	NA	NA	NA	NA NA	NA NA	NA NA
BENZO(A)PYRENE	15	400	15	14.5 J	17.9 U	11.7 J	165	3.56 U	29.6 J	129 J	46.3 J	87.6 J	4920	NA	NA	NA	NA NA	NA NA	NA NA
BENZO(B)FLUORANTHENE	150	900	150	22.1 J	17.9 U	15.5 J	263	3.56 U	54	194 J	67.4 J	131 J	7120	NA	NA	NA	NA NA	NA NA	NA NA
BENZO(G,H,I)PERYLENE	170000	800	800	18 U	17.9 U	18 U	119	1.92 J	25.8 J	59.5 J	28.4 J	44 J	2070	NA	NA	NA	NA NA	NA NA	NA NA
BENZO(K)FLUORANTHENE	1500	900	900	18 U	17.9 U	18 U	92.4	3.56 U	15.8 J	71.2 J	28.8 J	50 J	2480	NA	NA	NA	NA NA	NA NA	NA NA
CHRYSENE	15000	400	400	24.1 J	17.9 U	16.5 J	238	3.56 U	39.8	161 J	48.1 J	105 J	5650	NA	NA	NA	NA NA	NA NA	NA NA
DIBENZO(A,H)ANTHRACENE	15	400	15	18 U	17.9 U	18 U	124	3.56 U	17.2 U	24.7	10.1 J	17.4 J	820	NA	NA	NA	NA NA	NA NA	NA NA
FLUORANTHENE	230000	20000	20000	31 J	17.9 U	20 J	424	3.56 U	50.6	350 J	103 J	226 J	13400	NA	NA	NA	NA NA	NA NA	
FLUORENE	230000	28000	28000	18 U	17.9 U	18 U	21.7 J	3.56 U	17.2 U	29.5	6.3 J	17.9 J	1220	NA	NA	NA	NA NA	NA NA	NA NA
INDENO(1,2,3-CD)PYRENE	150	900	150	15.1 J	17.9 U	12 J	99.1	3.56 U	24.6 J	55.1 J	23.5 J	39.3 J	2070	NA	NA	NA	NA NA	NA NA	NA NA
NAPHTHALENE	3600	54000	3600	18 U	17.9 U	18 U	18.9 U	3.56 U	18.4 J	24.5 J	14.7 J	19.6 J	751	NA	NA	NA	NA NA	NA NA	NA NA
PHENANTHRENE	170000	40000	40000	13.6 J	17.9 U	11.3 J	235	3.56 U	34.5	280 J	77.9 J	179 J	9530	NA	NA				
PYRENE	170000	13000	13000	31.2 J	17.9 U	20.1 J	371	3.05 J	46.1	264 J	79.1 J	172 J	10100	NA	NA	NA	NA NA	NA NA	NA NA
PCBS (UG/KG)																			
AROCLOR-1260	220		220	NA	NA	NA	NA	NA	NA	24.7 J	24.2 J	24.4 J	416 J	18.1 U	17.7 U	17.8 U	17.8 U	17.2 L	J 17.5 U
TOTAL AROCLOR	220	10000	220	NA	NA	NA	NA	NA	NA	24.7 J	24.2 J	24.4 J	416 J	18.1 UJ	17.7 UJ	17.8 UJ	17.8 UJ	17.2 U.	17.5 UJ

# TABLE 4-1 ANALYTICAL RESULTS - SURFACE SOIL ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

SAMPLE ID				DSY-SB204-	DSY-SB204-	DSY-SB204-	DSY-SB205-	DSY-SB206-	DSY-SB207-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-SB216	DSY-SO-SB217	DSY-SO-	DSY-SO-SB224-	DSY-SO-
SAIMI EE ID				SO-0002	SO-0002-D	SO-0002-AVG		SO-0002	SO-0002				SB209-0.30.7	SB215-000.5		000.5		000.5-D	SB224-000.5- AVG
TARGET AREA				HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2		HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP- 14 AREA	BLDG. 6 - TP- 14 AREA		BLDG. 6 - TP- 14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP- 14 AREA				
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209	DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.3 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH				2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT	0.5 FT	0.5 FT				
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM	NM	FD	NM
METALS (MG/KG)																			
ALUMINUM	7700		7700	5740	5380	5560	9650	5850	6720	10900	10900	10900	9120	NA	NA	N/A	NA NA	N/	NA NA
ARSENIC	0.39	7	0.39	3.35	3.57	3.46	9.81	2.41	6.16	21.8 J	21.6 J	21.7 J	10.4 J	NA	NA	N/A	NA NA	N/	NA NA
BARIUM	1500	5500	1500	6.46	6.2	6.33	33.2	11.6	18.2	26.1 J	35.4 J	30.8 J	22.6 J	NA	NA	N/A	NA NA	N/	NA NA
BERYLLIUM	16	0.4	0.4	0.243 J	0.234 J	0.238 J	0.658	0.38	0.462 J	0.57 J	0.576	0.573 J	0.463	NA	NA	N/A	NA NA	N/	NA NA
CADMIUM	7	39	7	0.11 U	0.111 U	0.11 U	0.229 UJ	0.109 U	0.208 U	0.603 U	0.122 U	0.362 U	0.232 J	NA	NA	N/A	NA NA	N/	NA NA
CALCIUM				1710	650	1180	2290	695	715	416 J	611 J	514 J	1110 J	NA	NA	N/	NA NA	N/	NA NA
CHROMIUM	0.29	390	0.29	9.16	8.14	8.65	16.1	9.79	9.58	14.6	13.9	14.2	12.8	NA	NA	N/	NA NA	N/	NA NA
COBALT	2.3		2.3	4.55	4.05	4.3	9.56	3.94	6.42	14.6 J	13.9 J	14.2 J	8.62 J	NA	NA	N/	NA NA	N/	NA NA
COPPER	310	3100	310	8.07 J	7.7 J	7.88 J	39.1 J	6.65 J	21.6 J	23.4 J	24.8 J	24.1 J	33.5 J	NA	NA	N/	NA NA	N/	NA NA
IRON	5500		5500	16100	14700	15400	27100	13900	19600	32000	28800	30400	22500	NA	NA	N/	NA NA	N/	NA NA
LEAD	400	150	150	4.18 J	3.95 J	4.06 J	50.6 J	3.38 J	24.9 J	18.4 J	16.4 J	17.4 J	26.5 J	NA	NA	N/	NA NA	N/	NA NA
MAGNESIUM				2120	1940	2030	2680	2300	2100	2840	2910	2880	2910	NA	NA	N/	NA NA	N/	NA NA
MANGANESE	180	390	180	148 J	135 J	142 J	337 J	155 J	149 J	435	348	392	293	NA	NA	N/	NA NA	N/	NA NA
MERCURY	0.56	23	0.56	0.0292 U	0.0379 U	0.0336 U	0.037	0.038 U	0.0204 J	0.0247 J	0.0359 U	0.0213 J	0.0168 J	NA	NA	N/A	NA NA	N/	NA NA
NICKEL	150	1000	150	12.2	11.5	11.8	21.4	12	15.8	25.5		25.9	21.1	NA	NA			N/	
POTASSIUM				271 J	287 J	279 J	614 J	639 J	318 J	904 U	304 J	378 J	394 J	NA	NA				
SELENIUM	39	390	39	0.276 UJ	0.277 UJ	0.276 UJ	0.572 UJ	0.273 UJ	0.52 UJ	1.51 U	0.631	0.693	0.301 J	NA	NA				
SODIUM				166 U	166 U	166 U	343 U	164 U	312 U	904 U	182 U	543 U	71.4 J	NA	NA				
VANADIUM	39	550	39		8.84	9.57	21.1	9.48	12.3	25.1	18.6		14.2	NA	NA			• • •	1
ZINC	2300	6000	2300	28.1 J	25.3 J	26.7 J	77 J	26.2 J	51.5 J	75.5 J	86.4 J	81 J	137 J	NA	NA	NA NA	NA NA	N/	NA NA
PETROLEUM HYDROCARBONS (MG/KG)																			
DIESEL RANGE ORGANICS		500			12.8	8.17	29.8	7.11 U	31.6	44.8			366	NA	NA				
GASOLINE RANGE ORGANICS		500	500	5.87 U	4.28 U	5.08 U	4.48 U	5.52 U	4.06 U	2.83 J	4.82 J	3.82 J	3.74 U	NA	NA	N/	NA NA	N/	NA NA

### Notes:

EPARSLSORE\_NCx 0.1 - USEPA Regional Screening Level for Residential Soil, June 2011. Carcinogenic values represent an incremental cancer risk of 1E-06. The noncarcinogenic values are the RSL divided by 10 to correspond to a Target Hazard Quotient of 0.1.

RISORES - Rhode Island Department of Environmental Management (RIDEM) Residential Soil Criteria, DEM-DSR-01-93, February 2004.

MIN\_SO - lowest of the RSL and RIDEM criteria

## TABLE 4-2 ANALYTICAL RESULTS - SUBSURFACE SOIL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

SAMPLE ID	1			DSY-SB201-SO-	DSY-SB202-SO-	DSY-SB204-	DSY-SB205-	DSY-SB206-	DSY-SB207-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-
OAIIII EE ID					0204	SO-0810	SO-088.5	SO-0810	SO-1012		SB211-0102			SB214-0203
TARGET AREA				SOUTHERN	SOUTHERN	HUTS 1	HUTS 1	HUTS 1	HUTS 1		BLDG. 6 - TP-			
				WATERFRONT	WATERFRONT	AND 2	AND 2	AND 2	AND 2	14 AREA	14 AREA	14 AREA	14 AREA	14 AREA
LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
SACODE	EPARSLSOR E_NCx0_1	RISORES	MIN_SO	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
VOLATILES (UG/KG)														
CARBON DISULFIDE	82000		82000	NA	NA	2.65 U	2.6 J	2.51 U	2.16 U	NA	. NA	NA NA	. NA	
M+P-XYLENES				NA	NA	2.8 J	4.36 U	5.03 U	4.32 U	NA	. NA	NA NA	. NA	NA NA
POLYCYCLIC AROMATIC														
HYDROCARBONS (UG/KG)	04000	100000	04000	2.22.11	0.04.11	0.40.11	0.40.11	0.50 11	0.00.11	0.00.11	0.00	0.00	00.11	004
2-METHYLNAPHTHALENE	31000	123000	31000	3.66 U	3.61 U	3.42 U	3.48 U	3.53 U		3.83 U	8.89 J	3.38 J	3.9 U	
ACENAPHTHENE	340000	43000	43000	3.66 U	3.61 U	3.42 U	3.62 J	3.53 U		3.83 U	4.11 U	3.53 U		5.63 U
ACENAPHTHYLENE	340000	23000	23000	3.66 U		3.42 U		3.53 U			3.5 J	14.2		
ANTHRACENE	1700000	35000	35000	3.66 U		3.42 U	_	0.00 0			4.11 U		_	
BENZO(A) ANTHRACENE	150	900	150	3.66 UJ	3.61 UJ	3.42 UJ	_	3.53 UJ	3.63 UJ	_		60.5		
BENZO(A)PYRENE	15		15	3.66 U	3.61 U	3.42 U			3.63 U	26.3				
BENZO(B)FLUORANTHENE	150	900	150	3.66 U	3.61 U	3.42 U				38.8				
BENZO(G,H,I)PERYLENE	170000	800	800	3.66 U	3.61 U	3.42 U	21.6			15.7		_		-
BENZO(K)FLUORANTHENE	1500	900	900	3.66 U	3.61 U	3.42 U	11.2			16.1	17.5			
CHRYSENE	15000	400	400	3.66 U	3.61 U	3.42 U	32.1	3.53 U	3.63 U	28.6			20.5	
DIBENZO(A,H)ANTHRACENE	15	400	15	3.66 U	3.61 U	3.42 U	23.3	3.53 U	3.63 U	3.83 U	7.48 J	7.89 J	3.9 U	43.7
FLUORANTHENE	230000	20000	20000	3.66 U	3.61 U	3.42 U	55.3	3.53 U	2.19 J	61.2	39.6	128	43.2	451
FLUORENE	230000	28000	28000	3.66 U	3.61 U	3.42 U	2.93 J	3.53 U	3.63 U	2.22 J	4.11 U	8.85 J	2.67 J	5.63 U
INDENO(1,2,3-CD)PYRENE	150	900	150	3.66 U	3.61 U	3.42 U	18	3.53 U	3.63 U	12.3 J	18.5	17.4	10.2 J	82.7
NAPHTHALENE	3600	54000	3600	3.66 U	3.61 U	3.42 U	3.54 J	3.53 U	3.63 U	2.5 J	9.04 J	5.06 J	3.9 U	175
PHENANTHRENE	170000	40000	40000	3.66 U	3.61 U	3.42 U	30.8	3.53 U	2.1 J	24.8	25.2	91.3	25.8	
PYRENE	170000	13000	13000	3.66 U	3.61 U	3.42 U	47.4	3.53 U	2.05 J	50.1	35.8	94.2	33.9	375

## TABLE 4-2 ANALYTICAL RESULTS - SUBSURFACE SOIL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

SAMPLE ID				DSY-SB201-SO-	DSY-SB202-SO-	DSY-SB204-	DSY-SB205-	DSY-SB206-	DSY-SB207-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-
				0204	0204	SO-0810	SO-088.5	SO-0810	SO-1012	SB210-0102	SB211-0102	SB212-0204	SB213-0203	SB214-0203
TARGET AREA					SOUTHERN	HUTS 1		HUTS 1			BLDG. 6 - TP-			
				WATERFRONT	WATERFRONT	AND 2	AND 2	AND 2	AND 2	14 AREA	14 AREA	14 AREA	14 AREA	14 AREA
LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
SACODE	EPARSLSOR E_NCx0_1	RISORES	MIN_SO	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
METALS (MG/KG)														
ALUMINUM	7700		7700	17400	15900	3290	5790	3190	6100	12600	11700	2180	12500	9150
ANTIMONY	3.1	10	3.1	0.912 UJ	0.858 UJ	0.425 UJ	0.84 UJ	0.43 UJ	0.88 UJ	2.38 UJ	0.476 UJ	0.428 UJ	2.27 UJ	1.15 J
ARSENIC	0.39	7	0.39	15.9	26.3	3.62	7.42	4.44	9.79	13 J	13.5 J	1.47 J	11.8 J	47.2 J
BARIUM	1500	5500	1500	14.6	14.8	4.5	8.85	4.43	5.11	24.2 J	31 J	20.4 J	16.4 J	57.7 J
BERYLLIUM	16	0.4	0.4	0.418 J	0.392 J	0.176 J	0.314 J	0.204 J	0.34 J	0.511 J	0.607	0.697	0.507 J	0.759
CADMIUM	7	39	7	0.228 U	0.214 U	0.106 U	0.21 U	0.108 U	0.22 U	0.595 U	0.119 U	0.107 U	0.567 U	0.0903 J
CALCIUM				1770	1000	443	1020	429	496 J	620 J	279 J	501 J	631 J	2040 J
CHROMIUM	0.29	390	0.29	21.2	18.2	4.98	9.49	5.27	8.77	15.4	12	0.788	18.5	11.6
COBALT	2.3		2.3	17.9	21.1	5.15	4.54	3.68	5.85	11.1 J	8.75 J	1.29 J	12.4 J	17 J
COPPER	310	3100	310	29.9 J	28.2 J	4.42 J	12.5 J	5.25 J	11.7 J	20 J	13.7 J	1.67 J	19.1 J	39.5 J
IRON	5500		5500	44400	45500	9830	18300	12200	20900	35900	23600	6800	30900	22100
LEAD	400	150	150	9.49 J	13.6 J	1.96 J	13.8 J	2.81 J	8.23 J	12 J	16.1 J	2.49 J	17 J	81.4 J
MAGNESIUM				5220	4850	1110	1830	1110	1850	3610	2280	646	4010	2030
MANGANESE	180	390	180	488 J	681 J	169 J	145 J	95.7 J	171 J	428	358	305	346	1190
MERCURY	0.56	23	0.56	0.0351 U	0.0312 U	0.0331 U	0.0125 J	0.03 U	0.031 U	0.0138 J	0.0323 J	0.0276 U	0.0343 U	0.0603
NICKEL	150	1000	150	38.6	37.9	9.68		8.8			17		25.9	
POTASSIUM				243 J	257 J	219 J	248 J	188 J	161 J	242 J	226 J	681 J	346 J	264 J
SELENIUM	39	390	39	0.57 UJ	0.536 U	0.16 J	0.525 UJ	0.269 UJ	0.55 UJ	1.49 U	0.67	0.268 U	1.42 U	1.31
SODIUM				342 U	322 U	160 U	315 U	161 U	330 U	179 U	178 U	161 U	170 U	90.6 J
VANADIUM	39			18.6	17.7	5.82		_		19.8	17.7	3.97	20.6	
ZINC	2300	6000	2300	72.8 J	75.7 J	17.9 J	36 J	21.9 J	41.1 J	65.9 J	53.6 J	27.1 J	64.7 J	335 J
PETROLEUM HYDROCARBONS (MG/KG)														
DIESEL RANGE ORGANICS		500	500	NA	NA	7.49	6.99 U	6.83 U	7.31 U	37.6	48.2	17.8	25	NA NA

### Notes:

EPARSLSORE\_NCx 0.1 - USEPA Regional Screening Level for Residential Soil, June 2011. Carcinogenic values represent an incremental cancer risk of 1E-06. The noncarcinogenic values are the RSL divided by 10 to correspond to a Target Hazard Quotient of 0.1.

RISORES - Rhode Island Department of Environmental Management (RIDEM) Residential Soil Criteria, DEM-DSR-01-93, February 2004.

MIN\_SO - lowest of the RSL and RIDEM criteria

# TABLE 4-3 ANALYTICAL RESULTS - GROUNDWATER FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

SAMPLE ID				DSY-GW- MW02A-022411	DSY-GW-MW03- 022411	DSY-GW- MW08-030111	DSY-GW- MW11A-022611	DSY-GW- MW11A-022611- D	DSY-GW- MW11A-022611 AVG	DSY-GW-MW12- 030311	DSY-GW- MW204- 031711	DSY-GW- MW218- 030111	DSY-GW- MW219- 031611	DSY-GW- MW219- 031611-D	DSY-GW- MW219- 031611-AVG	DSY-GW- MW220-030111	DSY-GW-MW221- 030211	DSY-GW- MW222-030211	DSY-GW-MW223- 031611
TARGET AREA				NORTHERN WATERFRONT	NORTHERN WATERFRONT	BLDG. 234 AREA	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	HUTS 1 AND 2	BLDG. 42	BLDG. 42	BLDG. 42	BLDG 42	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRTONT (UPGRADIENT LOC.)
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204	DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11	03/01/11	03/16/11	03/16/11	03/16/11	03/01/11	03/02/11	03/02/11	03/16/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM
VOLATILES (UG/L)																			
1,1-DICHLOROETHENE	7	7	7	0.5 U	0.5 U	0.25 J	0.5 L				0.5 U			0.5 U				0.5 U	
ACETONE				5 UJ	5 UJ	5 U	5 L							3.28 J	2.89 J	5 U		5 U	
CIS-1,2-DICHLOROETHENE	70	70	70		0.5 U	12.7	0.284	0.361 J	0.322 J	3.73	0.5 U	1		0.5 U	0.5 U	4.26		0.5 U	0.5 U
TETRACHLOROETHENE	5	5	5	0.5 U	0.696 J	0.5 U	0.5 L		0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOTAL 1,2-DICHLOROETHENE				0.291 J	0.5 U	12.7	0.953	J 1.04 J	0.996 J	8.54	0.5 U	0.5 L	0.5 U	0.5 U	0.5 U	5.36	1.49	0.5 U	0.5 U
TRANS-1,2-DICHLOROETHENE	100	100	100	0.5 U	0.5 U	0.5 U	0.669	0.683 J	0.676 J	4.81	0.5 U	0.5 L	0.5 U	0.5 U	0.5 U	1.1	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	5	5	5	0.5 U	7.35	3.9	5.15	4.97	5.06	9.61	3.16	0.5 L	0.5 U	0.5 U	0.5 U	0.5 U	12.2	5.48	0.5 U
TRICHLOROFLUOROMETHANE				1 UJ	1 UJ	0.581 J	1 L	1 U	1 U	1 U	1 U	1 L	1 U	1 U	1 U	1 U	1 U	1 U	1 U
VINYL CHLORIDE	2	2	2	0.5 U	0.5 U	0.263 J	0.5 L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 L	0.5 U	0.5 U	0.5 U	1.47	0.5 U	0.5 U	0.5 U
METALS (UG/L)																			
ALUMINUM				NA	NA	53.7	N/	NA NA	. NA	NA NA	337	52.9	312	274	293	NA NA	NA	NA	. NA
ARSENIC	10		10	NA	NA	1.32 J	N/	NA NA	NA NA	NA NA	1.5 UJ	27.8	74.5 J	78.1 J	76.3 J	NA	NA	NA	. NA
BARIUM	2000	2000	2000	NA	NA	17	N/	NA NA	. NA	. NA	11.6	86.6	34	34.9	34.4	. NA	NA	NA	. NA
CADMIUM	5	5	5	NA	NA	0.286 J	N/	NA NA	. NA	NA NA	0.5 U	0.5 L	1.53	1.41	1.47	. NA	NA	NA	. NA
CALCIUM				NA	NA	46800	N/	NA NA	. NA	. NA	29100 J	79700	38400 J	40000 J	39200 J	NA	NA	NA	. NA
CHROMIUM	100	100	100	NA	NA	1 U	N/	NA NA	. NA	. NA	0.508 J	5 L	1 U	1 U	1 U	NA	NA	NA	. NA
COBALT				NA	NA	1.74 J	N/	NA NA	. NA	. NA	2.5 U	24.8	13.7	14.1	13.9	NA NA	NA	NA	. NA
COPPER	1300		1300	NA	NA	1.57 J	N/	NA NA	NA NA	NA NA	2 U	2 L	2 U	2 U	2 U	NA	NA	NA	. NA
IRON				NA	NA	459	N/	NA NA	NA NA	NA NA	605 J	11100	61900 J	65800 J	63800 J	NA	NA	NA	. NA
LEAD	15	15	15	NA	NA	0.75 U	N/	NA NA	NA NA	NA NA	0.75 U	3.75 L	1.28	1.07	1.18	NA NA	NA	NA	. NA
MAGNESIUM				NA			N/	NA NA	NA NA	NA NA	7110 J	16700	8090 J	8400 J	8240 J	NA		NA	
MANGANESE				NA			N/							4880	4700	NA NA		NA	
NICKEL		100	100				N/							1.5 U		NA		NA	
POTASSIUM				NA			N/								6080	NA NA		NA	
SELENIUM	50	50	50	NA	NA	1.25 U	N/	NA NA	NA NA	NA NA	1.25 U	6.25 L		1.24 J	1.4 J	NA	NA	NA	
SODIUM				NA			N/A						34400	35400	34900	NA NA		NA	
ZINC				NA	NA	29.8 J	N/	NA NA	NA NA	NA NA	6.65	3.59	1.58 J	1.52 J	1.55 J	NA NA	NA	NA	. NA

## TABLE 4-3 ANALYTICAL RESULTS - GROUNDWATER FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

SAMPLE ID				DSY-GW- MW02A-022411	DSY-GW-MW03- 022411	DSY-GW- MW08-030111	DSY-GW- MW11A-022611	DSY-GW- MW11A-022611-	DSY-GW- MW11A-022611- AVG	030311	DSY-GW- MW204- 031711	DSY-GW- MW218- 030111	MW219-	MW219-	DSY-GW- MW219- 031611-AVG	DSY-GW- MW220-030111	DSY-GW-MW221- 030211	DSY-GW- MW222-030211	DSY-GW-MW223- 031611
TARGET AREA				NORTHERN	NORTHERN	BLDG. 234	NORTHERN	NORTHERN	NORTHERN	NORTHERN	HUTS 1 AND				BLDG 42	NORTHERN	NORTHERN	NORTHERN	NORTHERN
				WATERFRONT	WATERFRONT		WATERFRONT	WATERFRONT	WATERFRONT	WATERFRONT	2					WATERFRONT	WATERFRONT	WATERFRONT	WATERFRTONT (UPGRADIENT LOC.)
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204	DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11	03/01/11	03/16/11	03/16/11	03/16/11	03/01/11	03/02/11	03/02/11	03/16/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM
DISSOLVED METALS (UG/L)																			
ALUMINUM				NA	NA	36.6 J	NA	. NA	NA	NA	72	29.7 J	36.9 J	38 J	37.4 J	NA	NA NA	. NA	. NA
ARSENIC	10		10	NA	NA	1.37 J	NA	. NA	NA	NA	1.5 UJ	29.1	77.1 J	78.9 J	78 J	NA	NA	. NA	. NA
BARIUM	2000	2000	2000			-	NA	1		NA	11.5	-	-					. NA	
CADMIUM	5	5	5	NA			NA			NA	0.5 U	0.5 U			-				
CALCIUM				NA	. NA	47800	NA	. NA	NA	NA	30800 J	76600	39400 J	39000 J	39200 J	NA	. NA	. NA	. NA
COBALT				NA			NA		NA	NA	2.5 U				13.6				
COPPER	1300		1300			_	NA			NA	1.19 J	2 U		2 U	_			. NA	
IRON				NA		_	NA			NA	50.5 J	9900		62600 J	63200 J	NA			
LEAD	15	15	15	NA	NA		NA	. NA	NA	NA	0.75 U	3.75 U		0.488 J	0.578 J	NA		. NA	. NA
MAGNESIUM				NA	NA		NA	. NA	NA	NA	7450 J	16200		8090 J	8180 J	NA		. NA	
MANGANESE				NA	. NA		NA	. NA	NA	NA	53.3			4610	4800	NA NA		. NA	. NA
NICKEL		100	100				NA				3.39			1.75 U	1.75 U				
POTASSIUM				NA			NA			NA	1770			6240					
SELENIUM	50	50	50	NA			NA			NA	1.25 U			1.44 J	1.39 J	NA			
SODIUM				NA			NA			NA	42300	61900		35900	35800	NA NA			
ZINC				NA	NA NA	16.6	NA	NA NA	NA	NA	6.48	3.5 J	2.5 U	2.5 U	2.5 U	NA	NA NA	. NA	. NA

### Notes:

FEDMCL - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites,

June, 2011. [Cancer benchmark value = 1E-06, Hazard index (HI) = 0.1].

RIGAOB - Rhode Island Department of Environmental Management GA Groundwater Criteria, RIDEM, DEM-DSR-01-93, February 2004.

MIN\_GW - lowest of the MCL and RIDEM criteria

### TABLE 4-4 ANALYTICAL RESULTS - SOIL GAS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

SAMPLE ID			DSY-SG-MW02A-	DSY-SG-MW03-	DSY-SG-MW03-	DSY-SG-MW03-	DSY-SG-MW11A-	DSY-SG-MW12-
G == 15			0708	0608	0608-D	0608-AVG	0203	0506
TARGET AREA			NORTHERN	NORTHERN	NORTHERN	NORTHERN	NORTHERN	NORTHERN
			WATERFRONT	WATERFRONT	WATERFRONT	WATERFRONT	WATERFRONT	WATERFRONT
LOCATION ID			DSY-MW02A	DSY-MW03	DSY-MW03	DSY-MW03	DSY-MW11A	DSY-MW12
SAMPLE DATE			02/24/11	02/24/11	02/24/11	02/24/11	03/03/11	03/03/11
TOP DEPTH								
BOTTOM DEPTH								
SACODE			NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
SUBMATRIX			NA	NA	NA	NA	NA	NA
QC TYPE	VISGR1	VISGR01	NM	NM	FD	NM	NM	NM
VOLATILES (UG/M3)								
1,1,1-TRICHLOROETHANE	5200	52000	0.1 J	0.26	0.26	0.26	0.11 J	0.055 J
1,1,2- TRICHLOROTRIFLUOROETHAN E	31000	310000	0.79 J	0.5 J	0.53 J	0.515 J	0.6 J	0.57 J
1,1-DICHLOROETHANE	15	150	0.25	0.16	0.076 J	0.118 J	0.11 J	0.086 J
1,2,4-TRIMETHYLBENZENE	7.3	73	0.38 J	2.4 J	0.35 UJ	1.29 J	0.58 J	1
1,3,5-TRIMETHYLBENZENE <sup>3</sup>	7.3	73	0.34 U	1.1	0.35 U	0.638	0.39 U	0.3 J
1,3-BUTADIENE	0.81	8.1	3.1	2.3	2.3	2.3	13	6.4
1-ETHYL-4-METHYL BENZENE	NA	NA	0.36 J	1.5 J	0.35 UJ	0.838 J	0.47 J	1
2-BUTANONE	5200	52000	3.3	6.1	5.2	5.65	17	11
2-HEXANONE	31	310	0.28 J	1.1 U	1.1 U	1.1 U	0.83 J	1 J
4-METHYL-2-PENTANONE	3100	31000	0.87	0.26 J	0.21 J	0.235 J	0.84	0.97
ACRYLONITRILE	0.36	3.6	1.4 U	1.5 U	1.5 U	1.5 U	2.8	1.8 U
BENZENE	3.1	31	5.2	0.71	0.67	0.69	6.8	4.8
CHLOROBENZENE	52	520	0.31 U	0.32 U	0.32 U	0.32 U	0.3 J	0.17 J
CHLOROETHANE	10000	100000	0.17 U	0.18 U	0.18 U	0.18 U	1.3 J	0.6 J
CHLOROFORM	1.1	11	0.18 J	0.14 J	0.15 J	0.145 J	0.7 J	0.27 J
CHLOROMETHANE	94	940	0.13 U	0.14 U	0.14 U	0.14 U	4.9	1.3
CIS-1,2-DICHLOROETHENE	63	630	0.14	0.062 J	0.014 U	0.0345 J	27	0.017 U
CYCLOHEXANE	6300	63000	1.8	0.24 U	0.24 U	0.24 U		0.44 J
DICHLORODIFLUOROMETHANE	100	1000	2.2	3	3	3	2.4	2
ETHYLBENZENE	9.7	97	1.1	0.25 J	0.13 J	0.19 J	0.57	0.92
HEXANE	730	7300	4.8	2.1	1.7	1.9		3
M+P-XYLENES <sup>1</sup>	100	1000	0.87	0.73 J	0.15 J	0.44 J	0.81	1.7
METHYL TERT-BUTYL ETHER	94	940	0.0085 J	0.014 U	0.014 U	0.014 U	0.016 U	0.015 J
METHYLENE CHLORIDE	52	520	0.23 U	1.5	0.65 J	1.08 J	0.8 J	1 J
N-HEPTANE	NA	NA	1.8	0.47 J	0.6	0.535 J	1.6	2.7
O-XYLENE	100	1000	0.34	0.58 J	0.064 J	0.322 J	0.41	0.8
STYRENE	1000	10000	0.28 U	0.29 U	0.29 U	0.29 U	0.69	0.43 J
TETRACHLOROETHENE	4.1	41	4.7	1	1.1	1.05	12	
TOLUENE	5200	52000	7.2	0.8	0.67	0.735	2.6	3.5
TOTAL 1,2-DICHLOROETHENE <sup>4</sup>	63	630	0.14	0.062 J	0.014 U	0.0345 J	31.1	0.017 U
TOTAL XYLENES	100	1000	1.21	1.31 J	0.214 J	0.762 J	1.22	2.5
TRANS-1,2-DICHLOROETHENE	63	630	0.013 U	0.014 U	0.014 U	0.014 U		0.017 U
TRICHLOROETHENE <sup>2,5</sup>	2.1	21	0.088 J	7.7	7.8	7.75		1.3
TRICHLOROFLUOROMETHANE	730	7300	1.9	1.8	1.8	1.8	1.8	7.4
VINYL CHLORIDE	1.6	16	0.76	0.39 J	0.15 J	0.27 J	0.49	0.32

Notes: - USEPA Regional Screening Level, June 2011. Values is the residential

air screening level adjusted using an attenuation factor of 0.1 (VISGR1) and 0.01 (VISGR01).

Carcinogenic values represent an incremental cancer risk of 1E-06.

Noncarcinogenic values represent a hazard quotient of 0.1.

- 1 Value is for m-xylene.
- 2 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 3 Value is for 1,2,4-trimethylbenzene.
- 4 Value is for trans-1,2-dichloroethene.
- 5 Screening criteria for trichloroethene was calculated using toxicity criteria from IRIS.

## TABLE 5-1 SCREENING CRITERIA FOR SOIL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RI PAGE 1 OF 2

CAS		USEPA Regional S	Screening Levels <sup>(1)</sup>		Department of
No.	Parameter	Direct Contact	Protection of	Direct Exposure	Management <sup>(2)</sup> GA Leachability
V I (" 0		Residential	Groundwater	Residential	Criteria
78-93-3	anic Compounds (ug/kg)  2-Butanone	2,800,000 N	1,000	10,000,000	NA
591-78-6	2-Hexanone	2,800,000 N 21,000 N	7.9	10,000,000 NA	NA NA
67-64-1	Acetone	6,100,000 N	2,400	7,800,000	NA NA
71-43-2	Benzene	1,100 C	0.2	2,500	200
75-15-0	Carbon Disulfide	82.000 N	210	NA	NA NA
108-90-7	Chlorobenzene	29,000 N	49	210,000	3,200
100-41-4	Ethylbenzene	5,400 C	1.5	71,000	27,000
	m+p-Xylenes	59,000 N <sup>(3)</sup>	180 <sup>(3)</sup>	110,000 (11)	NA
75-09-2	Methylene Chloride	36,000 N <sup>(4)</sup>	2.5	45,000	NA NA
108-88-3	Toluene	500,000 N	590	190,000	32,000
540-59-0	Total 1,2-Dichloroethene	70,000 N	37	630,000	NA
1330-20-7	Total Xylenes	63,000 N	190	110,000	540,000
79-01-6	Trichloroethene	440 N <sup>(4)</sup>	0.16	13,000	200
	Organic Compounds (ug/kg)	1			
108-60-1	2,2'-Oxybis(1-chloropropane)	4,600 C	0.11	NA	NA
91-57-6	2-Methylnaphthalene	23,000 N	140	123,000	NA
95-48-7	2-Methylphenol	310,000 N	580	NA	NA
106-44-5	4-Methylphenol	610,000 N	1,100	NA	NA
83-32-9	Acenaphthene	340,000 N	4,100	43,000	NA
208-96-8	Acenaphthylene	340,000 N <sup>(5)</sup>	4,100 <sup>(5)</sup>	23,000	NA
120-12-7	Anthracene	1,700,000 N	42,000	35,000	NA
56-55-3	Benzo(a)anthracene	150 C	10	900	NA
50-32-8	Benzo(a)pyrene	15 C	3.5	400	240,000
205-99-2	Benzo(b)fluoranthene	150 C	35	900	NA
191-24-2	Benzo(g,h,i)perylene	170,000 N <sup>(6)</sup>	9,500 <sup>(6)</sup>	800	NA
207-08-9	Benzo(k)fluoranthene	1,500 C	350	900	NA
117-81-7	Bis(2-ethylhexyl)phthalate	35,000 C	17	46,000	120,000
85-68-7	Butyl Benzyl Phthalate	260,000 C	200	NA	NA
86-74-8	Carbazole	NA 15 aga a	NA 1 100	NA 188	NA
218-01-9	Chrysene	15,000 C	1,100	400	NA NA
53-70-3	Dibenzo(a,h)anthracene	15 C	11	400	NA NA
84-74-2 117-84-0	di-n-Butyl Phthalate di-n-Octyl Phthalate	610,000 N NA	1,700 NA	NA NA	NA NA
206-44-0	Fluoranthene	230,000 N	70,000	20,000	NA NA
86-73-7	Fluorene	230,000 N	4,000	28,000	NA NA
67-72-1	Hexachloroethane	4,300 N <sup>(4)</sup>	0.48	46,000	NA NA
193-39-5	Indeno(1,2,3-cd)pyrene	4,300 N	120	900	NA NA
91-20-3	Naphthalene	3,600 C	0.47	54,000	800
85-01-8	Phenanthrene	170,000 N <sup>(6)</sup>	9,500 <sup>(6)</sup>	40,000	NA NA
108-95-2	Phenol	1,800,000 N	2,600	6,000,000	NA NA
129-00-0		170,000 N	9,500	13,000	NA NA
Pesticides/P		,550 11	5,500	.5,500	101
72-54-8	4,4'-DDD	2,000 C	66	NA	NA
72-55-9	4,4'-DDE	1,400 C	46	NA	NA
50-29-3	4,4'-DDT	1,700 C	67	NA	NA
309-00-2	Aldrin	29 C	0.034	NA	NA
5103-71-9	alpha-Chlordane	1,600 C <sup>(7)</sup>	1.8 <sup>(7)</sup>	500 <sup>(7)</sup>	1,400 <sup>(7)</sup>
11097-69-1	Aroclor-1254	110 N <sup>(4)</sup>	8.8	NA	NA
	Aroclor-1260	220 C	24	NA	NA
60-57-1	Dieldrin	30 C	0.061	40	NA
72-20-8	Endrin	1,800 N	68	NA	NA
5103-74-2	gamma-Chlordane	1,600 C <sup>(7)</sup>	1.8 <sup>(7)</sup>	500 <sup>(7)</sup>	1,400 <sup>(7)</sup>
76-44-8	Heptachlor	110 C	0.14	NA	NA
1024-57-3	Heptachlor Epoxide	53 C	0.068	NA	NA
1336-36-3	Total Aroclors	220 C	26	10,000	10,000
Metals (mg/l	(g)				
7429-90-5	Aluminum	7,700 N	23,000	NA	NA
7440-36-0	Antimony	3.1 N	0.27	10	0.05 (12)
7440-38-2	Arsenic	0.39 C	0.0013	7	NA

## TABLE 5-1 SCREENING CRITERIA FOR SOIL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RI PAGE 2 OF 2

CAS		USEPA Regional S	Screening Levels <sup>(1)</sup>		Department of Management <sup>(2)</sup>
No.	Parameter	Direct Contact Residential	Protection of Groundwater	Direct Exposure Residential	GA Leachability Criteria
7440-39-3	Barium	1,500 N	120	5,500	23 (12)
7440-41-7	Beryllium	16 N	13	1.5	0.03 (12)
7440-43-9	Cadmium	7 N	0.52	39	0.03 (12)
7440-70-2	Calcium	NA	NA	NA	NA
7440-47-3	Chromium	0.29 C <sup>(8)</sup>	0.00059 <sup>(8)</sup>	390 <sup>(8)</sup>	1.1 (12)
7440-48-4	Cobalt	2.3 N	0.21	NA	NA
7440-50-8	Copper	310 N	22	3,100	NA
7439-89-6	Iron	5,500 N	270	NA	NA
7439-92-1	Lead	400	14 <sup>(9)</sup>	150	0.04 (12)
7439-95-4	Magnesium	NA	NA	NA	NA
7439-96-5	Manganese	180 N	21	390	NA
7439-97-6	Mercury	2.3 N <sup>(10)</sup>	0.033	23	0.02 (12)
7440-02-0	Nickel	150 N	20	1,000	1 (12)
7440-09-7	Potassium	NA	NA	NA	NA
7782-49-2	Selenium	39 N	0.4	390	0.6 (12)
7440-22-4	Silver	39 N	0.6	200	NA
7440-23-5	Sodium	NA	NA	NA	NA
7440-62-2	Vanadium	39 N	78	550	NA
7440-66-6	Zinc	2,300 N	290	6,000	NA
	us Parameters (ug/kg)				
1002-53-5	Dibutyltin	1800 N	NA	NA	NA
78763-54-9	Monobutyltin	1800 N <sup>(13)</sup>	NA	NA	NA
1461-25-2	Tetrabutyltin	1800 N <sup>(13)</sup>	NA	NA	NA
56573-85-4		1800 N	NA	NA	NA
Petroleum H	ydrocarbons (mg/kg)				
	Diesel Range Organics	NA	NA	NA	NA
	Gasoline Range Organics	NA	NA	NA	NA
8001-58-9	Creosote	NA	NA	NA	NA
	Total Petroleum Hydrocarbons	NA	NA	500	500

- 1 USEPA Regional Screening Level, May 2012. Carcinogenic values represent an incremental cancer risk of 1E-06. The noncarcinogenic values are the RSL divided by 10 to correspond to a Target Hazard Quotient of 0.1. Protection of groundwater values are risk-based SSLs.
- 2 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 3 Value is for m-xylene.
- 4 Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 5 Value is for acenaphthene.
- 6 Value is for pyrene.
- 7 Value is for chlordane.
- 8 Value is for hexavalent chromium.
- 9 Value is MCL based soil screening level.
- 10 Value is for mercuric chloride (and other mercury salts).
- 11 Value is for total xylenes.
- 12 Leachability criteria for inorganics are based on SPLP/TCLP analysis and are in units of mg/L.
- 13 Value is for dibutylin and tributyltin.
- 14 A SSL is not available for mercuric chloride therefore the value for elemental mercury is presented.
- N Noncarcinogenic
- C Carcinogenic
- NA Not Available.

### TABLE 5-2 SCREENING CRITERIA FOR GROUNDWATER FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

		USEPA Regional	USEPA	RIDEM GA	USEPA Groundwater
CAS	Parameter	Screening Level <sup>(1)</sup>	MCL <sup>(2)</sup>	Groundwater	Volatilization
No.		Tap Water		Objective <sup>(3)</sup>	Criteria <sup>(4)</sup>
Volatile Orga	nic Compounds (ug/L)				
75-35-4	1,1-Dichloroethene	26 N	7	7	20 N
67-64-1	Acetone	1,200 N	NA	NA	2,300,000 N
156-59-2	cis-1,2-Dichloroethene	2.8 N	70	70	NA
127-18-4	Tetrachloroethene	3.5 N <sup>(5)</sup>	5	5	5.8 N <sup>(5)</sup>
540-59-0	Total 1,2-Dichloroethene	13 N	NA	NA	NA
156-60-5	trans-1,2-Dichloroethene	8.6 N	100	100	38 N
79-01-6	Trichloroethene	0.26 N <sup>(5)</sup>	5	5	0.52 N <sup>(5)</sup>
75-69-4	Trichlorofluoromethane	110 N	NA	NA	18 N
75-01-4	Vinyl Chloride	0.015 C	2	2	0.14 C
Metals (ug/L)					
7429-90-5	Aluminum	1,600 N	50 - 200 <sup>(6)</sup>	NA	NA
7440-38-2	Arsenic	0.045 C	10	10	NA
7440-39-3	Barium	290 N	2,000	2000	NA
7440-43-9	Cadmium	0.69 N	5	5	NA
7440-70-2	Calcium	NA	NA	NA	NA
7440-47-3	Chromium	0.031 C	100 <sup>(7)</sup>	100 <sup>(8)</sup>	NA
7440-48-4	Cobalt	0.47 N	NA	NA	NA
7440-50-8	Copper	62 N	1,300 <sup>(9)</sup>	NA	NA
7439-89-6	Iron	1,100 N	300 <sup>(9)</sup>	NA	NA
7439-92-1	Lead	NA	15 <sup>(9)</sup>	15	NA
7439-95-4	Magnesium	NA	NA	NA	NA
7439-96-5	Manganese	32 N	50 <sup>(6)</sup>	NA	NA
7440-02-0	Nickel	30 N	NA	100	NA
7440-09-7	Potassium	NA	NA	NA	NA
7782-49-2	Selenium	7.8 N	50	50	NA
7440-23-5	Sodium	NA	NA	NA	NA
7440-66-6	Zinc	470 N	5,000 <sup>(6)</sup>	NA	NA

### Notes:

- USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May, 2012. [Cancer benchmark value = 1E-06, Hazard index (HI) = 0.1].
- 2 2012 Edition of the Drinking Water Standards and Health Advisories (USEPA, April 2012).
- 3 RIDEM, DEM-DSR-01-93, November 2011.
- 4 USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs. Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 5 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 6 Secondary Drinking Water Regulation (USEPA, April 2012).
- 7- Value is for hexavalent chromium.
- 8 Value is for total chromium.
- 9 The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.

NVT = Not sufficiently volatile and/or toxic to pose inhalation risk.

NA = Not available.

## TABLE 5-3 SCREENING CRITERIA FOR SOIL GAS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RI

CAS	Daniel de la constante de la c	Soil Gas
No.	Parameter	Screening Level <sup>(1)</sup>
Volatile Or	ganic Compounds (ug/m³)	
	1,1,1-Trichloroethane	5,200 N
76-13-1	1,1,2-Trichlorotrifluoroethane	31,000 N
75-34-3	1,1-Dichloroethane	15 C
95-63-6	1,2,4-Trimethylbenzene	7.3 N
108-67-8	1,3,5-Trimethylbenzene	7.3 N <sup>(4)</sup>
	1,3-Butadiene	0.81 C
622-96-8	1-Ethyl-4-Methyl Benzene	NA
78-93-3	2-Butanone	5,200 N
591-78-6	2-Hexanone	31 N
108-10-1	4-Methyl-2-Pentanone	3,100 N
107-13-1	Acrylonitrile	0.36 C
71-43-2	Benzene	3.1 C
	Chlorobenzene	52 N
	Chloroethane	10,000 N
	Chloroform	1.1 C
74-87-3	Chloromethane	94 N
156-59-2	cis-1,2-Dichloroethene	63 N <sup>(5)</sup>
110-82-7	Cyclohexane	6,300 N
75-71-8	Dichlorodifluoromethane	100 N
100-41-4	Ethylbenzene	9.7 C
110-54-3	Hexane	730 N
	m+p-Xylenes	100 N <sup>(2)</sup>
1634-04-4	Methyl Tert-Butyl Ether	94 C
75-09-2	Methylene Chloride	630 N <sup>(3)</sup>
142-82-5	n-Heptane	NA
95-47-6	o-Xylene	100 N
100-42-5	Styrene	1,000 N
127-18-4	Tetrachloroethene	42 N <sup>(3)</sup>
108-88-3	Toluene	5,200 N
540-59-0	Total 1,2-Dichloroethene	63 N <sup>(5)</sup>
	Total Xylenes	100 N
	Trans-1,2-Dichloroethene	63 N
	Trichloroethene	2.1 N <sup>(3)</sup>
	Trichlorofluoromethane	730 N
75-01-4	Vinyl Chloride	1.6 C

- 1 USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
- 2 Value is for m-xylene.
- 3 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 4 Value is for 1,2,4-trimethylbenzene.
- 5 Value is for trans-1,2-dichloroethene.
- N Noncarcinogenic
- C Carcinogenic

# TABLE 5-4 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Volatile Org	ganic Compounds					•						•	
78-93-3	2-Butanone	3.01 J	3.26 J	ug/kg	DSY-SB204-SO-0002-D	1/19	3.92 - 12	3.26	NA	2,800,000 N	10,000,000	No	BSL
591-78-6	2-Hexanone	3.17 J	4.96 J	ug/kg	DSY-SB204-SO-0002-D	1/19	1.96 - 12	4.96	NA	21,000 N	NA	No	BSL
67-64-1	Acetone	9.96 J	120	ug/kg	DSY-S-TP18-0001-D	10/19	10 - 41	120	NA	6,100,000 N	7,800,000	No	BSL
71-43-2	Benzene	1 J	1 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	1	NA	1,100 C	2,500	No	BSL
75-15-0	Carbon Disulfide	3.28 J	3.28 J	ug/kg	DSY-SB205-SO-0002	1/19	1.96 - 12	3.28	NA	82,000 N	NA	No	BSL
108-90-7	Chlorobenzene	3 J	3 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	3	NA	29,000 N	210,000	No	BSL
108-88-3	Toluene	1 J	4 J	ug/kg	DSY-S-TP23-0001	6/19	1.96 - 11	4	NA	500,000 N	190,000	No	BSL
1330-20-7	Total Xylenes	1 J	2 J	ug/kg	DSY-S-TP23-0001	2/19	5.88 - 12	2	NA	63,000 N	110,000	No	BSL
79-01-6	Trichloroethene	2 J	2 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	2	NA	440 N <sup>(8)</sup>	13,000	No	BSL
	e Organic Compounds												
108-60-1	2,2'-Oxybis(1-Chloropropane)	39 J	39 J	ug/kg	DSY-S-TP18-0001-D	1/15	330 - 12000	39	NA	4,600 C	NA	No	BSL
91-57-6	2-Methylnaphthalene	14.5 J	14.5 J	ug/kg	DSY-SB207-SO-0002	1/19	3.56 - 12000	14.5	NA	23,000 N	123,000	No	BSL
83-32-9	Acenaphthene	17.8 J	17.8 J	ug/kg	DSY-SB205-SO-0002	2/19	3.56 - 12000	17.8	NA	340,000 N	43,000	No	BSL
208-96-8	Acenaphthylene	19.9 J	19.9 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	19.9	NA	340,000 N <sup>(9)</sup>	23,000	No	BSL
120-12-7	Anthracene	51.1	51.1	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	51.1	NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	15.7 J	710 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	710	NA	150 C	900	Yes	ASL
50-32-8	Benzo(a)pyrene	11.7 J	680 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	680	NA	15 C	400	Yes	ASL
205-99-2	Benzo(b)fluoranthene	15.5 J	1,000 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,000	NA	150 C	900	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	1.92 J	119	ug/kg	DSY-SB205-SO-0002	4/19	17.9 - 12000	119	NA	170,000 N <sup>(10)</sup>	800	No	BSL
207-08-9	Benzo(k)fluoranthene	15.8 J	92.4	ug/kg	DSY-SB205-SO-0002	3/19	3.56 - 12000	92.4	NA	1,500 C	900	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	44 J	150 J	ug/kg	DSY-S-TP18-0001	8/15	330 - 12000	150	NA	35,000 C	46,000	No	BSL
218-01-9	Chrysene	16.5 J	690 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	690	NA	15,000 C	400	Yes	ASL
53-70-3	Dibenzo(a,h)anthracene	124	124	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	124	NA	15 C	400	Yes	ASL
206-44-0	Fluoranthene	20 J	1,400 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,400	NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	21.7 J	21.7 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	21.7	NA	230,000 N	28,000	No	BSL
67-72-1	Hexachloroethane	55 J	55 J	ug/kg	DSY-S-TP20-0001	1/15	330 - 12000	55	NA	4,300 N <sup>(8)</sup>	46,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	12 J	520 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	520	NA	150 C	900	Yes	ASL
91-20-3	Naphthalene	18.4 J	18.4 J	ug/kg	DSY-SB207-SO-0002	1/19	3.56 - 12000	18.4	NA	3,600 C	54,000	No	BSL
85-01-8	Phenanthrene	11.3 J	730 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	730	NA	170,000 N <sup>(10)</sup>	40,000	No	BSL
108-95-2	Phenol	170 J	170 J	ug/kg	DSY-S-TP18-0001	1/15	330 - 12000	170	NA	1,800,000 N	6,000,000	No	BSL
129-00-0	Pyrene	3.05 J	1,400 J	ug/kg	DSY-S-TP16-0001	6/19	17.9 - 410	1,400	NA	170,000 N	13,000	No	BSL
Pesticides/						•						•	
72-55-9	4,4'-DDE	22	22	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	22	NA	1,400 C	NA	No	BSL
50-29-3	4,4'-DDT	56	56	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	56	NA	1,700 C	NA	No	BSL
	alpha-Chlordane	2	7.3	ug/kg	DSY-S-TP28-0001	2/15	1.7 - 2.1	7.3	NA	1,600 C <sup>(11)</sup>	NA	No	BSL
	Aroclor-1260	24 J	24 J	ug/kg	DSY-S-TP16-0001	1/15	32 - 41	24	NA	220 C	NA	No	BSL
	Dieldrin	16	16	ug/kg	DSY-S-TP16-0001	1/15	3.2 - 4.1	16	NA	30 C	40	No	BSL
72-20-8		5.7	26	ug/kg	DSY-S-TP16-0001	2/15	3.2 - 3.6	26	NA	1,800 N	NA	No	BSL
	gamma-Chlordane	2.4	2.4	ug/kg	DSY-S-MW03-0_501	2/15	1.7 - 2.1	2.4	NA	1,600 C <sup>(11)</sup>	NA	No	BSL
	Heptachlor Epoxide	4.2	4.2	ug/kg	DSY-S-TP28-0001	1/15	1.7 - 2.1	4.2	NA	53 C	NA	No	BSL

# TABLE 5-4 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Metals	Tau ·	0.440.1	0.050	"	DOV 00005 00 0000	10/40		0.050	40.000	7 700 N	N. A.	I	DICO
	Aluminum	3,440 J	9,650	mg/kg	DSY-SB205-SO-0002	19/19	-	9,650	16,020	7,700 N	NA 7	No	BKG
	Arsenic	2.41	10.9 J	mg/kg	DSY-S-TP28-0001	17/19	2.9 - 3.3	10.9	13	0.39 C		No	BKG
	Barium	5.1	49.4	mg/kg	DSY-S-TP16-0001	18/19	4.1 - 4.1	49.4	51	1,500 N	5,500	No	BSL, BKG
	Beryllium	0.18 J	1.1	mg/kg	DSY-S-TP16-0001	10/19	0.15 - 0.21	1.1	0.58	16 N	1.5	No	BSL
7440-43-9	Cadmium	0.85 J	0.85 J	mg/kg	DSY-S-TP16-0001	1/19	0.109 - 0.64	0.85	0.17	7 N	39	No	BSL
7440-70-2	Calcium	237	2,290	mg/kg	DSY-SB205-SO-0002	18/19	91.1 - 91.1	2,290	1,598	NA	NA (18)	No	NUT
7440-47-3	Chromium	5.2	24.1	mg/kg	DSY-S-TP16-0001	17/19	6.5 - 6.9	24.1	16	0.29 C <sup>(12)</sup>	390 <sup>(12)</sup>	Yes	ASL
7440-48-4	Cobalt	2.6	14.7	mg/kg	DSY-S-TP16-0001	17/19	3.5 - 4.6	14.7	9	2.3 N	NA	Yes	ASL
7440-50-8	Copper	3.1	111	mg/kg	DSY-S-TP16-0001	19/19	1	111	12	310 N	3,100	No	BSL
7439-89-6	Iron	11,200 J	27,100	mg/kg	DSY-SB205-SO-0002	19/19	1	27,100	24,200	5,500 N	NA	Yes	ASL
7439-92-1	Lead	2.3 J	115 J	mg/kg	DSY-S-TP28-0001	19/19	-	115	40	400	150	No	BSL
7439-95-4	Magnesium	1,320	2,680	mg/kg	DSY-SB205-SO-0002	19/19	-	2,680	2,571	NA	NA	No	NUT
7439-96-5	Manganese	81.4 J	340 J	mg/kg	DSY-S-TP23-0001	19/19	-	340	349	180 N	390	No	BKG
7439-97-6	Mercury	0.0204 J	0.06	mg/kg	DSY-S-MW03-0_501	4/19	0.0292 - 0.17	0.06	0.18	2.3 N <sup>(13)</sup>	23	No	BSL, BKG
7440-02-0	Nickel	8.2 J	68.5	mg/kg	DSY-S-TP16-0001	13/19	9.3 - 14.4	68.5	15	150 N	1,000	No	BSL
7440-09-7	Potassium	198	639 J	mg/kg	DSY-SB206-SO-0002	19/19	-	639	651	NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.63 J	1 J	mg/kg	DSY-S-MW12-SS01	6/17	0.273 - 0.85	1	0.57	39 N	390	No	BSL
7440-23-5	Sodium	19.7 J	172	mg/kg	DSY-S-TP16-0001	7/19	11.7 - 343	172	231	NA	NA	No	NUT, BKG
7440-62-2	Vanadium	6.4	39	mg/kg	DSY-S-TP28-0001	19/19	-	39	34	39 N	550	No	BSL
7440-66-6	Zinc	22.8	883	mg/kg	DSY-S-TP16-0001	19/19	-	883	62	2,300 N	6,000	No	BSL
Miscellaneo	ous Parameters		•	-								- '	
1002-53-5	Dibutyltin	5.2 J	33	ug/kg	DSY-S-TP16-0001	2/15	49 - 50	33	NA	1,800 N	NA	No	BSL
78763-54-9	Monobutyltin	33	33	ug/kg	DSY-S-TP16-0001	1/15	49 - 50	33	NA	1,800 N <sup>(14)</sup>	NA	No	BSL
1461-25-2	Tetrabutyltin	2.5 J	5.8 J	ug/kg	DSY-S-TP22-0001	4/15	49 - 50	5.8	NA	1,800 N <sup>(14)</sup>	NA	No	BSL
56573-85-4	Tributyltin	3.6 J	30 J	ug/kg	DSY-S-TP16-0001	3/15	49 - 50	30	NA	1,800 N	NA	No	BSL

### TABLE 5-4

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
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### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 Value is for acenaphthene.
- 10 Value is for pyrene.
- 11 Value is for chlordane.
- 12 Value is for hexavalent chromium.
- 13 Value is for mercuric chloride (and other mercury salts).
- 14 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Associated Samples**

DSY-S-MW02-SS01

DSY-S-MW03-0\_501

DSY-S-MW04-SS01

DS1-5-WW04-550

DSY-S-MW11-0001

DSY-S-MW12-SS01

DSY-SB-11-0002

DSY-SB204-SO-0002

DSY-SB204-SO-0002-D

DSY-SB205-SO-0002

DSY-SB206-SO-0002

DSY-SB207-SO-0002

DSY-S-TP16-0001

DSY-S-TP18-0001

DSY-S-TP18-0001-D

DSY-S-TP19-0001

DSY-S-TP20-0001

DSY-S-TP21-0001

DSY-S-TP22-0001

DSY-S-TP23-0001

DSY-S-TP27-0001

DSY-S-TP28-0001

### **Definitions:**

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

#### **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

# TABLE 5-5 COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
	anic Compounds											
78-93-3	2-Butanone	3.26 J	3.26 J	ug/kg	DSY-SB204-SO-0002-D	1/19	3.92 - 12	3.26	NA	1,000	NA	No
	2-Hexanone	4.96 J	4.96 J	ug/kg	DSY-SB204-SO-0002-D	1/19	1.96 - 12	4.96	NA	7.9	NA	No
67-64-1	Acetone	9.96 J	120	ug/kg	DSY-S-TP18-0001-D	10/19	10 - 41	120	NA	2,400	NA	No
	Benzene	1 J	1 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	1	NA	0.2	200	Yes
75-15-0	Carbon Disulfide	3.28 J	3.28 J	ug/kg	DSY-SB205-SO-0002	1/19	1.96 - 12	3.28	NA NA	210	NA NA	No
108-90-7	Chlorobenzene	3 J	3 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	3	NA NA	49	3,200	No
108-88-3	Toluene	1 J	4 J	ug/kg	DSY-S-TP23-0001	6/19	1.96 - 11	4	NA NA	590	32,000	No
1330-20-7	Total Xylenes	1 J	2 J	ug/kg	DSY-S-TP23-0001	2/19	5.88 - 12	2	NA NA	190	540,000	No Yes
	Trichloroethene Organic Compounds	2 J	2 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	2	INA	0.16	200	res
	2,2'-Oxybis(1-Chloropropane)	39 J	39 J	ug/kg	DSY-S-TP18-0001-D	1/15	330 - 12000	39	NA	0.11	NA	Yes
91-57-6	2-Methylnaphthalene	14.5 J	14.5 J	ug/kg ug/kg	DSY-SB207-SO-0002	1/19	3.56 - 12000	14.5	NA NA	140	NA NA	No
83-32-9	Acenaphthene	17.8 J	17.8 J	ug/kg ug/kg	DSY-SB205-SO-0002	2/19	3.56 - 12000	17.8	NA NA	4,100	NA NA	No
208-96-8	Acenaphthylene	19.9 J	19.9 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	19.9	NA NA	4,100 (8)	NA NA	No
120-12-7	Anthracene	51.1	51.1	ug/kg ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	51.1	NA NA	42,000	NA NA	No
	Benzo(a)anthracene	15.7 J	710 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	710	NA NA	10	NA NA	Yes
	Benzo(a)pyrene	11.7 J	680 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	680	NA	3.5	240,000	Yes
	Benzo(b)fluoranthene	15.5 J	1,000 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,000	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	1.92 J	119	ug/kg	DSY-SB205-SO-0002	4/19	17.9 - 12000	119	NA	9,500 <sup>(9)</sup>	NA	No
207-08-9	Benzo(k)fluoranthene	15.8 J	92.4	ug/kg	DSY-SB205-SO-0002	3/19	3.56 - 12000	92.4	NA	350	NA	No
	Bis(2-ethylhexyl)phthalate	44 J	150 J	ug/kg	DSY-S-TP18-0001	8/15	330 - 12000	150	NA	17	120,000	Yes
	Chrysene	16.5 J	690 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	690	NA	1,100	NA	No
	Dibenzo(a,h)anthracene	124	124	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	124	NA	11	NA	Yes
206-44-0	Fluoranthene	20 J	1,400 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,400	NA	70,000	NA	No
86-73-7	Fluorene	21.7 J	21.7 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	21.7	NA	4,000	NA	No
67-72-1	Hexachloroethane	55 J	55 J	ug/kg	DSY-S-TP20-0001	1/15	330 - 12000	55	NA	0.48	NA	Yes
193-39-5	Indeno(1,2,3-cd)pyrene	12 J	520 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	520	NA	120	NA	Yes
91-20-3	Naphthalene	18.4 J	18.4 J	ug/kg	DSY-SB207-SO-0002	1/19	3.56 - 12000	18.4	NA	0.47	800	Yes
85-01-8	Phenanthrene	11.3 J	730 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	730	NA	9,500 <sup>(9)</sup>	NA	No
108-95-2	Phenol	170 J	170 J	ug/kg	DSY-S-TP18-0001	1/15	330 - 12000	170	NA	2,600	NA	No
129-00-0		3.05 J	1,400 J	ug/kg	DSY-S-TP16-0001	6/19	17.9 - 410	1,400	NA	9,500	NA	No
Pesticides/F	PCBs											
72-55-9	4,4'-DDE	22	22	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	22	NA	46	NA	No
	4,4'-DDT	56	56	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	56	NA	67	NA	No
	alpha-Chlordane	2	7.3	ug/kg	DSY-S-TP28-0001	2/15	1.7 - 2.1	7.3	NA	1.8 (10)	NA	Yes
	Aroclor-1260	24 J	24 J	ug/kg	DSY-S-TP16-0001	1/15	32 - 41	24	NA	24	NA	No
	Dieldrin	16	16	ug/kg	DSY-S-TP16-0001	1/15	3.2 - 4.1	16	NA	0.061	NA	Yes
	Endrin	5.7	26	ug/kg	DSY-S-TP16-0001	2/15	3.2 - 3.6	26	NA	68	NA	No
5103-74-2	gamma-Chlordane	2.4	2.4	ug/kg	DSY-S-MW03-0_501	2/15	1.7 - 2.1	2.4	NA	1.8 <sup>(10)</sup>	NA	Yes
	Heptachlor Epoxide	4.2	4.2	ug/kg	DSY-S-TP28-0001	1/15	1.7 - 2.1	4.2	NA	0.068	NA	Yes

# TABLE 5-5 COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
Metals												
	Aluminum	3,440 J	10,200	mg/kg	DSY-S-TP28-0001-D	19/19	-	10,200	16,020	23,000	NA	No
	Arsenic	2.41	10.9 J	mg/kg	DSY-S-TP28-0001	17/19	2.9 - 3.3	10.9	13	0.0013	NA	No
7440-39-3		5.1	49.4	mg/kg	DSY-S-TP16-0001	18/19	4.1 - 4.1	49.4	51	120	NA	No
Metals (Con												
	Beryllium	0.18 J	1.1	mg/kg	DSY-S-TP16-0001	10/19	0.15 - 0.21	1.1	0.58	13	NA	No
7440-43-9		0.85 J	0.85 J	mg/kg	DSY-S-TP16-0001	1/19	0.109 - 0.64	0.85	0.17	0.52	NA	Yes
7440-70-2	Calcium	237	2,290	mg/kg	DSY-SB205-SO-0002	18/19	91.1 - 91.1	2,290	1,598	NA	NA	No
7440-47-3	Chromium	5.2	24.1	mg/kg	DSY-S-TP16-0001	17/19	6.5 - 6.9	24.1	16	0.00059 <sup>(11)</sup>	NA	Yes
7440-48-4	Cobalt	2.6	14.7	mg/kg	DSY-S-TP16-0001	17/19	3.5 - 4.6	14.7	9	0.21	NA	Yes
7440-50-8	Copper	3.1	111	mg/kg	DSY-S-TP16-0001	19/19	-	111	12	22	NA	Yes
7439-89-6	Iron	11,200 J	27,100	mg/kg	DSY-SB205-SO-0002	19/19	-	27,100	24,200	270	NA	Yes
7439-92-1	Lead	2.3 J	115 J	mg/kg	DSY-S-TP28-0001	19/19	-	115	40	14 <sup>(12)</sup>	NA	Yes
7439-95-4	Magnesium	1,320	2,680	mg/kg	DSY-SB205-SO-0002	19/19	-	2,680	2,571	NA	NA	No
	Manganese	81.4 J	349 J	mg/kg	DSY-S-TP28-0001-D	19/19	-	349	349	21	NA	No
7439-97-6	Mercury	0.0204 J	0.06	mg/kg	DSY-S-MW03-0_501	4/19	0.0292 - 0.17	0.06	0.18	0.033	NA	No
7440-02-0	Nickel	8.2 J	68.5	mg/kg	DSY-S-TP16-0001	13/19	9.3 - 14.4	68.5	15	20	NA	Yes
7440-09-7	Potassium	198	639 J	mg/kg	DSY-SB206-SO-0002	19/19	-	639	651	NA	NA	No
7782-49-2	Selenium	0.63 J	1 J	mg/kg	DSY-S-MW12-SS01	6/17	0.273 - 0.85	1	0.57	0.4	NA	Yes
7440-23-5	Sodium	19.7 J	172	mg/kg	DSY-S-TP16-0001	7/19	11.7 - 343	172	231	NA	NA	No
7440-62-2	Vanadium	6.4	40	mg/kg	DSY-S-TP28-0001-D	19/19	-	40	34	78	NA	No
7440-66-6	Zinc	22.8	883	mg/kg	DSY-S-TP16-0001	19/19	-	883	62	290	NA	Yes
Miscellaneo	ous Parameters									_		
1002-53-5	Dibutyltin	5.2 J	33	ug/kg	DSY-S-TP16-0001	2/15	49 - 50	33	NA	NA	NA	No
78763-54-9	Monobutyltin	33	33	ug/kg	DSY-S-TP16-0001	1/15	49 - 50	33	NA	NA	NA	No
1461-25-2	Tetrabutyltin	2.5 J	5.8 J	ug/kg	DSY-S-TP22-0001	4/15	49 - 50	5.8	NA	NA	NA	No
56573-85-4	Tributyltin	3.6 J	30 J	ug/kg	DSY-S-TP16-0001	3/15	49 - 50	30	NA	NA	NA	No
TCLP Metal												
7440-38-2	Arsenic	4.4 J	4.4 J	ug/L	DSY-SB-11-0002	1/14	4 - 6.2	4.4	NA	NA	NA	No
7440-39-3	Barium	167	609	ug/L	DSY-S-MW02-SS01	7/14	41.3 - 719	609	NA	NA	23,000	No
7440-47-3	Chromium	10.6 J	40.5 J	ug/L	DSY-SB-11-0002	2/14	6 - 12	40.5	NA	NA	1,100	No
7439-92-1	Lead	5.7	71.9	ug/L	DSY-S-TP28-0001	4/14	1 - 5.7	71.9	NA	NA	40	Yes

### **TABLE 5-5**

## COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>		USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>		Exceeds Screening Criteria?
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### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
- 6 Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for acenaphthene.
- 9 Value is for pyrene.
- 10 Value is for chlordane.
- 11 Value is for hexavalent chromium.
- 12 Value is MCL based soil screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

### **Associated Samples**

DSY-S-MW02-SS01

DSY-S-MW03-0 501

DSY-S-MW04-SS01

DSY-S-MW11-0001

DSY-S-MW12-SS01

DSY-SB-11-0002

DSY-SB204-SO-0002

DSY-SB204-SO-0002-D

DSY-SB205-SO-0002

DSY-SB206-SO-0002

DSY-SB207-SO-0002

DSY-S-TP16-0001

DSY-S-TP18-0001

DSY-S-TP18-0001-D

DSY-S-TP19-0001

DSY-S-TP20-0001

DSY-S-TP21-0001 DSY-S-TP22-0001

DSY-S-TP23-0001

DSY-S-TP27-0001

DSY-S-TP28-0001

DSY-S-TP28-0001-D

**Definitions:** 

C = Carcinogen

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

### TABLE 5-6 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - NORTH WATERFRONT

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Volatile Org	anic Compounds												
78-93-3	2-Butanone	14	14	ug/kg	DSY-S-TP24-0102	1/21	4.32 - 110	14	NA	2,800,000 N	10,000,000	No	BSL
67-64-1	Acetone	16	240	ug/kg	DSY-S-MW11-2931	3/21	8.63 - 270	240	NA	6,100,000 N	7,800,000	No	BSL
75-15-0	Carbon Disulfide	2 J	2.6 J	ug/kg	DSY-SB205-SO-088.5	2/21	2.16 - 110	2.6	NA	82,000 N	NA	No	BSL
108-88-3	Toluene	2 J	2 J	ug/kg	DSY-S-TP24-0102	1/21	2.16 - 110	2	NA	500,000 N	190,000	No	BSL
540-59-0	Total 1,2-Dichloroethene	1 J	5 J	ug/kg	DSY-S-MW11-2931-D	1/21	2.16 - 110	5	NA	70,000 N	630,000	No	BSL
1330-20-7	Total Xylenes	2 J	2 J	ug/kg	DSY-S-MW11-0103, DSY-S-TP24-0102	2/21	6.47 - 110	2	NA	63,000 N	110,000	No	BSL
79-01-6	Trichloroethene	1 J	4 J	ug/kg	DSY-S-MW11-2931, DSY-S-MW11-2931-D	4/21	2.16 - 110	4	NA	440 N <sup>(8)</sup>	13,000	No	BSL
Semivolatile	Organic Compounds												
83-32-9	Acenaphthene	3.62 J	3.62 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.62	NA	340,000 N	43,000	No	BSL
208-96-8	Acenaphthylene	3.53 J	3.53 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.53	NA	340,000 N <sup>(9)</sup>	23,000	No	BSL
120-12-7	Anthracene	8	8	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	8	NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	27 J	53 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	53	NA	150 C	900	No	BSL
50-32-8	Benzo(a)pyrene	23.3	44 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA	15 C	400	Yes	ASL
205-99-2	Benzo(b)fluoranthene	2.65 J	71 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	71	NA	150 C	900	No	BSL
191-24-2	Benzo(g,h,i)perylene	2.51 J	21.6	ug/kg	DSY-SB205-SO-088.5	2/21	3.42 - 11000	21.6	NA	170,000 N <sup>(10)</sup>	800	No	BSL
207-08-9	Benzo(k)fluoranthene	11.2	11.2	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	11.2	NA	1,500 C	900	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	43 J	97 J	ug/kg	DSY-S-TP24-0102	5/17	330 - 11000	97	NA	35,000 C	46,000	No	BSL
218-01-9	Chrysene	32.1	44 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA	15,000 C	400	No	BSL
53-70-3	Dibenzo(a,h)anthracene	23.3	23.3	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	23.3	NA	15 C	400	Yes	ASL
84-74-2	di-n-Butyl Phthalate	42 J	270 J	ug/kg	DSY-S-MW04-1618	3/17	330 - 11000	270	NA	610,000 N	NA	No	BSL
206-44-0	Fluoranthene	2.19 J	81 J	ug/kg	DSY-S-TP24-0102-D	4/21	3.42 - 11000	81	NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	2.93 J	2.93 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	2.93	NA	230,000 N	28,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	18	18	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	18	NA	150 C	900	No	BSL
91-20-3	Naphthalene	3.54 J	3.54 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.54	NA	3,600 C	54,000	No	BSL
85-01-8	Phenanthrene	2.1 J	54 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	54	NA	170,000 N <sup>(10)</sup>	40,000	No	BSL
129-00-0	Pyrene	2.05 J	1,600 J	ug/kg	DSY-S-TP16-1112	4/21	3.42 - 420	1,600	NA	170,000 N	13,000	No	BSL
Pesticides/F	CBs											•	
309-00-2	Aldrin	4.4 J	4.4 J	ug/kg	DSY-S-TP16-1112	1/17	1.7 - 2.2	4.4	NA	29 C	NA	No	BSL
5103-71-9	alpha-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA	1,600 C <sup>(11)</sup>	NA	No	BSL
72-20-8	Endrin	15	15	ug/kg	DSY-S-TP16-1112	1/15	3.4 - 3.9	15	NA	1,800 N	NA	No	BSL
5103-74-2	gamma-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA	1,600 C <sup>(11)</sup>	NA	No	BSL
76-44-8	Heptachlor	2.4	3.8	ug/kg	DSY-S-MW02-2426	4/17	1.7 - 2.2	3.8	NA	110 C	NA	No	BSL
Metals													
7429-90-5	Aluminum	2,430 J	18,200	mg/kg	DSY-S-MW02-3436	39/39	-	18,200	13075	7,700 N	NA	Yes	ASL
7440-38-2		2.7 J	16.6	mg/kg	DSY-S-TP16-1112	37/39	4.1 - 4.7	16.6	20	0.39 C	7	No	BKG
7440-39-3	Barium	3.2	26.2 J	mg/kg	DSY-S-TP28-1314	26/39	2.1 - 6	26.2	36	1,500 N	5,500	No	BSL, BKG
7440-41-7	Beryllium	0.176 J	0.35 J	mg/kg	DSY-S-TP22-1112, DSY- S-TP28-0507, DSY-S- TP28-1314	22/39	0.18 - 0.26	0.35	0.64	16 N	1.5	No	BSL, BKG
7440-43-9	Cadmium	0.65 J	0.65 J	mg/kg	DSY-S-TP22-1112	1/39	0.106 - 1.1	0.65	0.23	7 N	39	No	BSL
7440-70-2	Calcium	305	3,480	mg/kg	DSY-S-MW02-1820	39/39	_	3,480	1689	NA	NA	No	NUT

### **TABLE 5-6**

### OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Metals (Con	tinued)											•	
7440-47-3	Chromium	2.2 J	27.1 J	mg/kg	DSY-S-MW02-3436	37/39	6 - 7.8	27.1	18	0.29 C <sup>(12)</sup>	390 <sup>(12)</sup>	Yes	ASL
7440-48-4	Cobalt	3 J	19.8	mg/kg	DSY-S-MW02-3436	33/39	2.6 - 3.2	19.8	17	2.3 N	NA	Yes	ASL
7440-50-8	Copper	4.1 J	30.9	mg/kg	DSY-S-MW02-3436	36/39	4.1 - 5	30.9	24	310 N	3,100	No	BSL
7439-89-6	Iron	6,970	44,400 J	mg/kg	DSY-S-MW11-2931	39/39	-	44,400	39173	5,500 N	NA	Yes	ASL
7439-92-1	Lead	1.6 J	29.2	mg/kg	DSY-S-MW03-1618	38/39	1.7 - 1.7	29.2	12	400	150	No	BSL
7439-95-4	Magnesium	921	7,680	mg/kg	DSY-S-MW02-3436	39/39	-	7,680	3811	NA	NA	No	NUT
7439-96-5	Manganese	55.4	549 J	mg/kg	DSY-S-TP22-1112	39/39	-	549	1037	180 N	390	No	BKG
7439-97-6	Mercury	0.0125 J	0.31	mg/kg	DSY-S-MW11-2931	4/39	0.03 - 0.18	0.31	0.012	2.3 N <sup>(13)</sup>	23	No	BSL
7440-02-0	Nickel	5.1	39.5	mg/kg	DSY-S-MW02-3436	37/39	14.1 - 15.7	39.5	28	150 N	1,000	No	BSL
7440-09-7	Potassium	132	1,190	mg/kg	DSY-S-MW12-SS12	39/39	-	1,190	1700	NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.16 J	1.3 J	mg/kg	DSY-S-MW12-SS16	9/36	0.269 - 1	1.3	0.29	39 N	390	No	BSL
7440-23-5	Sodium	23	117	mg/kg	DSY-S-TP20-1011	3/38	16.8 - 330	117	83	NA	NA	No	NUT
7440-62-2	Vanadium	4.3	23.9 J	mg/kg	DSY-S-MW11-2931	39/39	-	23.9	23	39 N	550	No	BSL
7440-66-6	Zinc	13.6 J	74.9	mg/kg	DSY-S-MW11-2931	39/39	-	74.9	66	2,300 N	6,000	No	BSL
Miscellaneo	us Parameters												
1461-25-2	Tetrabutyltin	3.3 J	8.5 J	ug/kg	DSY-S-TP24-0102-D	3/17	49 - 50	8.5	NA	1,800 N <sup>(14)</sup>	NA	No	BSL
56573-85-4	Tributyltin	1.4 J	15.1 J	ug/kg	DSY-S-MW11-2931	5/17	49 - 50	15.1	NA	1,800 N	NA	No	BSL

### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 Value is for acenaphthene.
- 10 Value is for pyrene.
- 11 Value is for chlordane.
- 12 Value is for hexavalent chromium.
- 13 Value is for mercuric chloride (and other mercury salts).
- 14 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Definitions:**

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

### **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

# OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Associated \$	Samples												
DSY-S-MW0	2-1820	DSY-S-TP16-1112											
DSY-S-MW0	2-2426	DSY-S-TP18-0507											
DSY-S-MW0	2-3436	DSY-S-TP18-1011											
DSY-S-MW0	3-0810	DSY-S-TP19-0507	,										
DSY-S-MW0	3-1618	DSY-S-TP19-1011											
DSY-S-MW0	1-0810	DSY-S-TP20-0507											
DSY-S-MW0	1-1618	DSY-S-TP20-1011											
DSY-S-MW1	I-0103	DSY-S-TP21-0507											
DSY-S-MW1	I-1113	DSY-S-TP21-1011											
DSY-S-MW1	I-1113-D	DSY-S-TP22-0506											

DSY-S-MW11-2729

DSY-S-MW11-2931 DSY-S-MW11-2931-D

DSY-S-MW12-SS05

DSY-S-MW12-SS12

DSY-S-MW12-SS16

DSY-SB204-SO-0810

DSY-SB205-SO-088.5

DSY-SB206-SO-0810 DSY-SB207-SO-1012

DSY-S-TP16-0506

DSY-S-TP22-1112 DSY-S-TP23-0507

DSY-S-TP23-0910

DSY-S-TP24-0102

DSY-S-TP24-0507

DSY-S-TP24-1011

DSY-S-TP27-0507 DSY-S-TP27-1011

DSY-S-TP28-0507

DSY-S-TP28-1314

DSY-S-TP24-0102-D

# TABLE 5-7 COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD

NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
Volatile Org	anic Compounds	L	l .							l l		l
78-93-3	2-Butanone	14	14	ug/kg	DSY-S-TP24-0102	1/21	4.32 - 110	14	NA	1,000	NA	No
67-64-1	Acetone	16	240	ug/kg	DSY-S-MW11-2931	3/21	8.63 - 270	240	NA	2,400	NA	No
75-15-0	Carbon Disulfide	2 J	2.6 J	ug/kg	DSY-SB205-SO-088.5	2/21	2.16 - 110	2.6	NA	210	NA	No
108-88-3	Toluene	2 J	2 J	ug/kg	DSY-S-TP24-0102	1/21	2.16 - 110	2	NA	590	32,000	No
540-59-0	Total 1,2-Dichloroethene	1 J	5 J	ug/kg	DSY-S-MW11-2931-D	1/21	2.16 - 110	5	NA	37	NA	No
1330-20-7	Total Xylenes	2 J	2 J	ug/kg	DSY-S-MW11-0103, DSY-S-TP24-0102	2/21	6.47 - 110	2	NA	190	540,000	No
79-01-6	Trichloroethene	1 J	4 J	ug/kg	DSY-S-MW11-2931, DSY-S-MW11-2931-D	4/21	2.16 - 110	4	NA	0.16	200	Yes
Semivolatile	Organic Compounds											
83-32-9	Acenaphthene	3.62 J	3.62 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.62	NA	4,100	NA	No
208-96-8	Acenaphthylene	3.53 J	3.53 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.53	NA	4,100 <sup>(8)</sup>	NA	No
120-12-7	Anthracene	8	8	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	8	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	27 J	53 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	53	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	23.3	44 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	2.65 J	71 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	71	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	2.51 J	21.6	ug/kg	DSY-SB205-SO-088.5	2/21	3.42 - 11000	21.6	NA	9,500 <sup>(9)</sup>	NA	No
207-08-9	Benzo(k)fluoranthene	11.2	11.2	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	11.2	NA	350	NA	No
117-81-7	Bis(2-ethylhexyl)phthalate	43 J	97 J	ug/kg	DSY-S-TP24-0102	5/17	330 - 11000	97	NA	17	120,000	Yes
218-01-9	Chrysene	32.1	44 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA	1,100	NA	No
53-70-3	Dibenzo(a,h)anthracene	23.3	23.3	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	23.3	NA	11	NA	Yes
84-74-2	di-n-Butyl Phthalate	42 J	270 J	ug/kg	DSY-S-MW04-1618	3/17	330 - 11000	270	NA	1,700	NA	No
206-44-0	Fluoranthene	2.19 J	81 J	ug/kg	DSY-S-TP24-0102-D	4/21	3.42 - 11000	81	NA	70,000	NA	No
86-73-7	Fluorene	2.93 J	2.93 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	2.93	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	18	18	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	18	NA	120	NA	No
91-20-3	Naphthalene	3.54 J	3.54 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.54	NA	0.47	800	Yes
85-01-8	Phenanthrene	2.1 J	54 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	54	NA	9,500 <sup>(9)</sup>	NA	No
129-00-0	Pyrene	2.05 J	1,600 J	ug/kg	DSY-S-TP16-1112	4/21	3.42 - 420	1,600	NA	9,500	NA	No
Pesticides/F	PCBs											
309-00-2	Aldrin	4.4 J	4.4 J	ug/kg	DSY-S-TP16-1112	1/17	1.7 - 2.2	4.4	NA	0.034	NA	Yes
5103-71-9	alpha-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA	1.8 <sup>(10)</sup>	NA	Yes
	Endrin	15	15	ug/kg	DSY-S-TP16-1112	1/15	3.4 - 3.9	15	NA	68	NA	No
	gamma-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA	13 (10)	NA	No
	Heptachlor	2.4	3.8	ug/kg	DSY-S-MW02-2426	4/17	1.7 - 2.2	3.8	NA	0.14	NA	Yes
Metals				<u> </u>							<u> </u>	
7429-90-5	Aluminum	2,430 J	18,200	mg/kg	DSY-S-MW02-3436	39/39	-	18,200	13,075	23,000	NA	No
7440-38-2		2.7 J	16.6	mg/kg	DSY-S-TP16-1112	37/39	4.1 - 4.7	16.6	20	0.0013	NA	Yes
7440-39-3		3.2	26.2 J	mg/kg	DSY-S-TP28-1314	26/39	2.1 - 6	26.2	36	120	NA	No
7440-41-7	Beryllium	0.176 J	0.35 J	mg/kg	DSY-S-TP22-1112, DSY- S-TP28-0507, DSY-S- TP28-1314	22/39	0.18 - 0.26	0.35	0.64	13	NA	No
7440-43-9	Cadmium	0.65 J	0.65 J	mg/kg	DSY-S-TP22-1112	1/39	0.106 - 1.1	0.65	0.23	0.52	NA	Yes

# COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
Metals (Cont	inued)											
7440-70-2	Calcium	305	3,480	mg/kg	DSY-S-MW02-1820	39/39	-	3,480	1,689	NA	NA	No
7440-47-3	Chromium	2.2 J	27.1 J	mg/kg	DSY-S-MW02-3436	37/39	6 - 7.8	27.1	18	0.00059 <sup>(11)</sup>	NA	Yes
7440-48-4	Cobalt	3 J	19.8	mg/kg	DSY-S-MW02-3436	33/39	2.6 - 3.2	19.8	17	0.21	NA	Yes
7440-50-8	Copper	4.1 J	30.9	mg/kg	DSY-S-MW02-3436	36/39	4.1 - 5	30.9	24	22	NA	Yes
7439-89-6	Iron	6,970	44,400 J	mg/kg	DSY-S-MW11-2931	39/39	-	44,400	39,173	270	NA	Yes
7439-92-1	Lead	1.6 J	29.2	mg/kg	DSY-S-MW03-1618	38/39	1.7 - 1.7	29.2	12	14 <sup>(12)</sup>	NA	Yes
7439-95-4	Magnesium	921	7,680	mg/kg	DSY-S-MW02-3436	39/39	-	7,680	3,811	NA	NA	No
	Manganese	55.4	549 J	mg/kg	DSY-S-TP22-1112	39/39	-	549	1,037	21	NA	No
	Mercury	0.0125 J	0.31	mg/kg	DSY-S-MW11-2931	4/39	0.03 - 0.18	0.31	0.012	0.033	NA	Yes
7440-02-0	Nickel	5.1	39.5	mg/kg	DSY-S-MW02-3436	37/39	14.1 - 15.7	39.5	28	20	NA	Yes
7440-09-7	Potassium	132	1,190	mg/kg	DSY-S-MW12-SS12	39/39	-	1,190	1,700	NA	NA	No
7782-49-2	Selenium	0.16 J	1.3 J	mg/kg	DSY-S-MW12-SS16	9/36	0.269 - 1	1.3	0.29	0.4	NA	Yes
7440-23-5	Sodium	23	117	mg/kg	DSY-S-TP20-1011	3/38	16.8 - 330	117	83	NA	NA	No
7440-62-2	Vanadium	4.3	23.9 J	mg/kg	DSY-S-MW11-2931	39/39	-	23.9	23	78	NA	No
7440-66-6	Zinc	13.6 J	74.9	mg/kg	DSY-S-MW11-2931	39/39	-	74.9	66	290	NA	No
Miscellaneo	us Parameters											
1461-25-2	Tetrabutyltin	3.3 J	8.5 J	ug/kg	DSY-S-TP24-0102-D	3/17	49 - 50	8.5	NA	NA	NA	No
56573-85-4	Tributyltin	1.4 J	15.1 J	ug/kg	DSY-S-MW11-2931	5/17	49 - 50	15.1	NA	NA	NA	No
TCLP Metals	·											
7440-38-2	Arsenic	5.8 J	5.8 J	UG/L)	DSY-S-TP24-0102	1/17	4 - 4	5.8	NA	NA	NA	No
7440-39-3	Barium	53.8	605	UG/L)	DSY-S-MW12-SS12	8/17	70 - 460	605	NA	NA	23,000	No
7439-92-1	Lead	6.1	48.8	UG/L)	DSY-S-MW02-3436	4/17	1 - 3.6	48.8	NA	NA	40	Yes

## Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- $\ensuremath{\mathtt{3}}$  The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, June 2011.
- 6 Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
- 7 Value is for acenaphthene.
- 8 Value is for pyrene.
- 9 Value is for chlordane.
- 10 Value is for hexavalent chromium.
- 11 Value is MCL based soil screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

## **Definitions:**

J = Estimated value

NA = Not Applicable/Not Available

# COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 3

**USEPA RSL** 

Migration from Soil

to Groundwater<sup>(5)</sup>

Background

Concentration<sup>(4)</sup>

RIDEM GA

Leachability

Criteria<sup>(6)</sup>

Exceeds

Screening

Criteria?

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>
Associated S	Samples							
DSY-S-MW02	-	DSY-S-TP16-1112						
DSY-S-MW02	2-2426	DSY-S-TP18-0507						
DSY-S-MW02	2-3436	DSY-S-TP18-1011						
DSY-S-MW03	3-0810	DSY-S-TP19-0507						
DSY-S-MW03	3-1618	DSY-S-TP19-1011						
DSY-S-MW04	4-0810	DSY-S-TP20-0507						
DSY-S-MW04	4-1618	DSY-S-TP20-1011						
DSY-S-MW1	1-0103	DSY-S-TP21-0507						
DSY-S-MW1	1-1113	DSY-S-TP21-1011						
DSY-S-MW1	1-1113-D	DSY-S-TP22-0506						
DSY-S-MW1	1-2729	DSY-S-TP22-1112						
DSY-S-MW1	1-2931	DSY-S-TP23-0507						
DSY-S-MW1	1-2931-D	DSY-S-TP23-0910						
DSY-S-MW12	2-SS05	DSY-S-TP24-0102						
DSY-S-MW12	2-SS12	DSY-S-TP24-0102-	-D					
DSY-S-MW12	2-SS16	DSY-S-TP24-0507						
DSY-SB204-S	SO-0810	DSY-S-TP24-1011						
DSY-SB205-S	SO-088.5	DSY-S-TP27-0507						

DSY-S-TP27-1011

DSY-S-TP28-0507

DSY-S-TP28-1314

DSY-SB206-SO-0810

DSY-SB207-SO-1012

DSY-S-TP16-0506

# OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Volatile Org	anic Compounds													
67-64-1	Acetone	10 J	10 J	ug/L	DSY-A-MW03-01	1/14	5 - 40	10	NA	1,200 N	NA NA	NA NA	No	BSL
156-59-2	cis-1,2-Dichloroethene	0.284 J	4.26	ug/L	DSY-GW-MW220-030111	5/9	0.5 - 0.5	4.26	NA	2.8 N	70 70	EPA-MCL RIDEM	Yes	ASL
127-18-4	Tetrachloroethene	0.696 J	0.696 J	ug/L	DSY-GW-MW03-022411	1/14	0.5 - 10	0.696	NA	3.5 N <sup>(7)</sup>	5 5	EPA-MCL RIDEM	No	BSL
156-60-5	trans-1,2-Dichloroethene	0.669 J	4.81	ug/L	DSY-GW-MW12-030311	3/9	0.5 - 0.5	4.81	NA	8.6 N	100 100	EPA-MCL RIDEM	No	BSL
79-01-6	Trichloroethene	3.16	33	ug/L	DSY-A-MW03-01-D	8/14	0.5 - 10	33	NA	0.26 N <sup>(7)</sup>	5 5	EPA-MCL RIDEM	Yes	ASL
75-01-4	Vinyl Chloride	1.47	1.47	ug/L	DSY-GW-MW220-030111	1/14	0.5 - 10	1.47	NA	0.015 C	2 2	EPA-MCL RIDEM	Yes	ASL
Metals (Tota	al)		L						<u> </u>					
	Aluminum	337	337	ug/L	DSY-GW-MW204-031711	1/6	43.9 - 227	337	NA	1,600 N	<b>50 - 200</b> NA	EPA-SDWR NA	Yes	ASL
7440-38-2	Arsenic	4.3 J	13.2	ug/L	DSY-A-MW11-01	3/6	1.5 - 4	13.2	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
7440-39-3	Barium	11.6	44.4	ug/L	DSY-A-MW02-01	3/6	10.4 - 33.5	44.4	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
7440-70-2	Calcium	22,000 J	80,200	ug/L	DSY-A-MW04-01	6/6	-	80,200	NA	NA	NA NA	NA NA	No	NUT
7440-47-3	Chromium	0.508 J	7.3 J	ug/L	DSY-A-MW11-01	2/6	6 - 6	7.3	NA	0.031 C	100 100	EPA-MCL RIDEM	Yes	ASL
7440-50-8	Copper	5.4 J	5.8 J	ug/L	DSY-A-MW03-01-D	1/6	2 - 5	5.8	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
7439-89-6	Iron	78.3 J	605 J	ug/L	DSY-GW-MW204-031711	3/6	134 - 216	605	NA	1,100 N	<b>300</b> NA	EPA-SDWR NA	Yes	ASL
7439-95-4	Magnesium	6,700 J	31,600	ug/L	DSY-A-MW02-01	6/6	-	31,600	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	30	373	ug/L	DSY-A-MW11-01	6/6	19.9 - 19.9	373	NA	32 N	<b>50</b> NA	EPA-SDWR NA	Yes	ASL
7440-02-0	Nickel	3.38	11.4 J	ug/L	DSY-A-MW03-01-D	2/6	9 - 9	11.4	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	1,660	17,100	ug/L	DSY-A-MW02-01	6/6	-	17,100	NA	NA	NA NA	NA NA	No	NUT
7440-23-5	Sodium	29,700	200,000	ug/L	DSY-A-MW02-01	6/6	-	200,000	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	6.65	68.3	ug/L	DSY-A-MW02-01	4/6	15.2 - 17.3	68.3	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
Metals (Diss														
	Aluminum	72	72	ug/L	DSY-GW-MW204-031711	1/1	-	72	NA	1,600 N	<b>50 - 200</b> NA	EPA-SDWR NA	Yes	ASL
7440-39-3	Barium	11.5	11.5	ug/L	DSY-GW-MW204-031711	1/1	-	11.5	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

## PAGE 2 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Dissolved M	letals (Continued)	•				•	•				•			
7440-70-2	Calcium	30,800 J	30,800 J	ug/L	DSY-GW-MW204-031711	1/1	-	30,800	NA	NA	NA NA	NA NA	No	NUT
7440-50-8	Copper	1.19 J	1.19 J	ug/L	DSY-GW-MW204-031711	1/1	-	1.19	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
7439-89-6	Iron	50.5 J	50.5 J	ug/L	DSY-GW-MW204-031711	1/1	-	50.5	NA	1,100 N	300 NA	EPA-SDWR NA	No	BSL
7439-95-4	Magnesium	7,450 J	7,450 J	ug/L	DSY-GW-MW204-031711	1/1	-	7,450	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	53.3	53.3	ug/L	DSY-GW-MW204-031711	1/1	-	53.3	NA	32 N	<b>50</b> NA	EPA-SDWR NA	Yes	ASL
7440-02-0	Nickel	3.39	3.39	ug/L	DSY-GW-MW204-031711	1/1	-	3.39	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	1,770	1,770	ug/L	DSY-GW-MW204-031711	1/1	-	1,770	NA	NA	NA NA	NA NA	No	NUT
7440-23-5	Sodium	42,300	42,300	ug/L	DSY-GW-MW204-031711	1/1	-	42,300	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	6.48	6.48	ug/L	DSY-GW-MW204-031711	1/1	-	6.48	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL

## Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented. Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

## **Associated Samples**

DSY-GW-MW02A-022411 DSY-GW-MW222-030211 DSY-GW-MW03-022411 DSY-GW-MW223-031611 DSY-GW-MW11A-022611 DSY-A-MW02-01 DSY-GW-MW11A-022611-D DSY-A-MW03-01 DSY-GW-MW12-030311 DSY-A-MW03-01-D DSY-GW-MW204-031711 DSY-A-MW04-01 DSY-GW-MW220-030111 DSY-A-MW11-01 DSY-GW-MW221-030211 DSY-A-MW12-01

## **Definitions:**

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

CAS = Chemical Abstracts Service

COPC = Chemical Of Potential Concern

EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)

EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

RIDEM = Rhode Island Department of Environmental Management GA Groundwater Objective (November, 2011).

## **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

## TABLE 5-9 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - NORTH WATERFRONT

## FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

				_
$D\Lambda$	GE	1 1	ΩF	2
ГΑ	UE.		О.	_

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Vapor Intrusion Criteria <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Volatile Org	anic Compounds													
67-64-1	Acetone	10 J	10 J	ug/L	DSY-A-MW03-01	1/14	5 - 40	10	NA	2,300,000 N	NA	NA	No	BSL
156-59-2	cis-1,2-Dichloroethene	0.284 J	4.26	ug/L	DSY-GW-MW220-030111	5/9	0.5 - 0.5	4.26	NA	NA	NA	NA	No	NTX
127-18-4	Tetrachloroethene	0.696 J	0.696 J	ug/L	DSY-GW-MW03-022411	1/14	0.5 - 10	0.696	NA	5.8 N <sup>(7)</sup>	NA	NA	No	BSL
156-60-5	trans-1,2-Dichloroethene	0.669 J	4.81	ug/L	DSY-GW-MW12-030311	3/9	0.5 - 0.5	4.81	NA	38 N	NA	NA	No	BSL
79-01-6	Trichloroethene	3.16	33	ug/L	DSY-A-MW03-01-D	8/14	0.5 - 10	33	NA	0.52 N <sup>(7)</sup>	NA	NA	Yes	ASL
75-01-4	Vinyl Chloride	1.47	1.47	ug/L	DSY-GW-MW220-030111	1/14	0.5 - 10	1.47	NA	0.14 C	NA	NA	Yes	ASL
Metals														
7429-90-5	Aluminum	337	337	ug/L	DSY-GW-MW204-031711	1/6	43.9 - 227	337	NA	NA	NA	NA	No	NTX
7440-38-2	Arsenic	4.3 J	13.2	ug/L	DSY-A-MW11-01	3/6	1.5 - 4	13.2	NA	NA	NA	NA	No	NTX
7440-39-3	Barium	11.6	44.4	ug/L	DSY-A-MW02-01	3/6	10.4 - 33.5	44.4	NA	NA	NA	NA	No	NTX
7440-70-2	Calcium	22,000 J	80,200	ug/L	DSY-A-MW04-01	6/6	-	80,200	NA	NA	NA	NA	No	NUT
7440-47-3	Chromium	0.508 J	7.3 J	ug/L	DSY-A-MW11-01	2/6	6 - 6	7.3	NA	NA	NA	NA	No	NTX
7440-50-8	Copper	5.4 J	5.8 J	ug/L	DSY-A-MW03-01-D	1/6	2 - 5	5.8	NA	NA	NA	NA	No	NTX
7439-89-6	Iron	78.3 J	605 J	ug/L	DSY-GW-MW204-031711	3/6	134 - 216	605	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	6,700 J	31,600	ug/L	DSY-A-MW02-01	6/6	-	31,600	NA	NA	NA	NA	No	NUT
7439-96-5	Manganese	30	373	ug/L	DSY-A-MW11-01	6/6	19.9 - 19.9	373	NA	NA	NA	NA	No	NTX
7440-02-0	Nickel	3.38	11.4 J	ug/L	DSY-A-MW03-01-D	2/6	9 - 9	11.4	NA	NA	NA	NA	No	NTX
7440-09-7	Potassium	1,660	17,100	ug/L	DSY-A-MW02-01	6/6	-	17,100	NA	NA	NA	NA	No	NUT
7440-23-5	Sodium	29,700	200,000	ug/L	DSY-A-MW02-01	6/6	-	200,000	NA	NA	NA	NA	No	NUT
7440-66-6	Zinc	6.65	68.3	ug/L	DSY-A-MW02-01	4/6	15.2 - 17.3	68.3	NA	NA	NA	NA	No	NTX
Dissolved N	letals													
7429-90-5	Aluminum	72	72	ug/L	DSY-GW-MW204-031711	1/1	-	72	NA	NA	NA	NA	No	NTX
7440-39-3	Barium	11.5	11.5	ug/L	DSY-GW-MW204-031711	1/1	-	11.5	NA	NA	NA	NA	No	NTX
7440-70-2		30,800 J	30,800 J	ug/L	DSY-GW-MW204-031711	1/1	-	30,800	NA	NA	NA	NA	No	NUT
7440-50-8	Copper	1.19 J	1.19 J	ug/L	DSY-GW-MW204-031711	1/1	-	1.19	NA	NA	NA	NA	No	NTX
7439-89-6	Iron	50.5 J	50.5 J	ug/L	DSY-GW-MW204-031711	1/1	-	50.5	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	7,450 J	7,450 J	ug/L	DSY-GW-MW204-031711	1/1	-	7,450	NA	NA	NA	NA	No	NUT
7439-96-5	Manganese	53.3	53.3	ug/L	DSY-GW-MW204-031711	1/1	-	53.3	NA	NA	NA	NA	No	NTX
7440-02-0	Nickel	3.39	3.39	ug/L	DSY-GW-MW204-031711	1/1	-	3.39	NA	NA	NA	NA	No	NTX
7440-09-7	Potassium	1,770	1,770	ug/L	DSY-GW-MW204-031711	1/1	-	1,770	NA	NA	NA	NA	No	NUT
7440-23-5	Sodium	42,300	42,300	ug/L	DSY-GW-MW204-031711	1/1	-	42,300	NA	NA	NA	NA	No	NUT
7440-66-6	Zinc	6.48	6.48	ug/L	DSY-GW-MW204-031711	1/1	-	6.48	NA	NA	NA	NA	No	NTX

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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## Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
- Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

## **Associated Samples**

DSY-GW-MW02A-022411	DSY-GW-MW12-030311	DSY-GW-MW220-030111	DSY-A-MW03-01-D
DSY-GW-MW03-022411	DSY-GW-MW204-031711	DSY-GW-MW221-030211	DSY-A-MW04-01
DSY-GW-MW11A-022611	DSY-A-MW02-01	DSY-GW-MW222-030211	DSY-A-MW11-01
DSY-GW-MW11A-022611-D	DSY-A-MW03-01	DSY-GW-MW223-031611	DSY-A-MW12-01

## **Definitions:**

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered C = Carcinogen

CAS = Chemical Abstracts Service COPC = Chemical Of Potential Concern J = Estimated value

NA = Not Applicable/Not Available

## **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BSL = Below COPC Screening Level

NTX = No toxicity criteria NUT = Essential nutrient

NVT = Not sufficiently volatile and/or toxic to pose inhalation risk.

# TABLE 5-10 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL GAS - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Range of Background Concentrations <sup>(4)</sup>	Screening Toxicity Value <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Volatile Org	anic Compounds				l .	1			l	l .			1	-
71-55-6	1,1,1-Trichloroethane	0.055 J	0.26	ug/m³	DSY-SG-MW03-0608, DSY-SG-MW03-0608-D	4/4	-	0.26	NA	5,200 N	NA	NA	No	BSL
76-13-1	1,1,2-Trichlorotrifluoroethane	0.5 J	0.79 J	ug/m <sup>3</sup>	DSY-SG-MW02A-0708	4/4	-	0.79	NA	31,000 N	NA	NA	No	BSL
75-34-3	1,1-Dichloroethane	0.076 J	0.25	ug/m <sup>3</sup>	DSY-SG-MW02A-0708	4/4	-	0.25	NA	15 C	NA	NA	No	BSL
95-63-6	1,2,4-Trimethylbenzene	0.38 J	2.4 J	ug/m <sup>3</sup>	DSY-SG-MW03-0608	4/4	0.35 - 0.35	2.4	NA	7.3 N	NA	NA	No	BSL
108-67-8	1,3,5-Trimethylbenzene	0.3 J	1.1	ug/m <sup>3</sup>	DSY-SG-MW03-0608	2/4	0.34 - 0.39	1.1	NA	7.3 N <sup>(6)</sup>	NA	NA	No	BSL
106-99-0	1,3-Butadiene	2.3	13	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	4/4	-	13	NA	0.81 C	NA	NA	Yes	ASL
622-96-8	1-Ethyl-4-Methyl Benzene	0.36 J	1.5 J	ug/m <sup>3</sup>	DSY-SG-MW03-0608	4/4	0.35 - 0.35	1.5	NA	NA	NA	NA	No	NTX
78-93-3	2-Butanone	3.3	17	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	4/4	-	17	NA	5,200 N	NA	NA	No	BSL
591-78-6	2-Hexanone	0.28 J	1 J	ug/m <sup>3</sup>	DSY-SG-MW12-0506	3/4	1.1 - 1.1	1	NA	31 N	NA	NA	No	BSL
108-10-1	4-Methyl-2-Pentanone	0.21 J	0.97	ug/m <sup>3</sup>	DSY-SG-MW12-0506	4/4	-	0.97	NA	3,100 N	NA	NA	No	BSL
107-13-1	Acrylonitrile	2.8	2.8	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	1/4	1.4 - 1.8	2.8	NA	0.36 C	NA	NA	Yes	ASL
71-43-2	Benzene	0.67	6.8	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	4/4	-	6.8	NA	3.1 C	NA	NA	Yes	ASL
108-90-7	Chlorobenzene	0.17 J	0.3 J	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	2/4	0.31 - 0.32	0.3	NA	52 N	NA	NA	No	BSL
75-00-3	Chloroethane	0.6 J	1.3 J	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	2/4	0.17 - 0.18	1.3	NA	10,000 N	NA	NA	No	BSL
67-66-3	Chloroform	0.14 J	0.7 J	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	4/4	-	0.7	NA	1.1 C	NA	NA	No	BSL
74-87-3	Chloromethane	1.3	4.9	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	2/4	0.13 - 0.14	4.9	NA	94 N	NA	NA	No	BSL
156-59-2	cis-1,2-Dichloroethene	0.062 J	27	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	3/4	0.014 - 0.017	27	NA	63 N <sup>(7)</sup>	NA	NA	No	BSL
110-82-7	Cyclohexane	0.3 J	1.8	ug/m <sup>3</sup>	DSY-SG-MW02A-0708	3/4	0.24 - 0.24	1.8	NA	6,300 N	NA	NA	No	BSL
75-71-8	Dichlorodifluoromethane	2	3	ug/m³	DSY-SG-MW03-0608, DSY-SG-MW03-0608-D	4/4	-	3	NA	100 N	NA	NA	No	BSL
100-41-4	Ethylbenzene	0.13 J	1.1	ug/m <sup>3</sup>	DSY-SG-MW02A-0708	4/4	-	1.1	NA	9.7 C	NA	NA	No	BSL
110-54-3	Hexane	1.7	4.8	ug/m <sup>3</sup>	DSY-SG-MW02A-0708	4/4	-	4.8	NA	730 N	NA	NA	No	BSL
	m+p-Xylenes	0.15 J	1.7	ug/m <sup>3</sup>	DSY-SG-MW12-0506	4/4	-	1.7	NA	100 N <sup>(8)</sup>	NA	NA	No	BSL
1634-04-4	Methyl Tert-Butyl Ether	0.0085 J	0.015 J	ug/m <sup>3</sup>	DSY-SG-MW12-0506	2/4	0.014 - 0.016	0.015	NA	94 C	NA	NA	No	BSL
75-09-2	Methylene Chloride	0.65 J	1.5	ug/m <sup>3</sup>	DSY-SG-MW03-0608	3/4	0.23 - 0.23	1.5	NA	630 N <sup>(9)</sup>	NA	NA	No	BSL
142-82-5	n-Heptane	0.47 J	2.7	ug/m <sup>3</sup>	DSY-SG-MW12-0506	4/4	-	2.7	NA	NA	NA	NA	No	NTX
95-47-6	o-Xylene	0.064 J	0.8	ug/m <sup>3</sup>	DSY-SG-MW12-0506	4/4	-	0.8	NA	100 N	NA	NA	No	BSL
100-42-5	Styrene	0.43 J	0.69	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	2/4	0.28 - 0.29	0.69	NA	1,000 N	NA	NA	No	BSL
127-18-4	Tetrachloroethene	1	12	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	4/4	-	12	NA	42 N <sup>(9)</sup>	NA	NA	No	BSL
108-88-3	Toluene	0.67	7.2	ug/m <sup>3</sup>	DSY-SG-MW02A-0708	4/4	_	7.2	NA	5,200 N	NA	NA	No	BSL
540-59-0	Total 1,2-Dichloroethene	0.062 J	31.1	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	3/4	0.014 - 0.017	31.1	NA	63 N <sup>(9)</sup>	NA	NA	No	BSL
1330-20-7	Total Xylenes	0.214 J	2.5	ug/m <sup>3</sup>	DSY-SG-MW12-0506	4/4	_	2.5	NA	100 N	NA	NA	No	BSL
156-60-5	trans-1,2-Dichloroethene	4.1	4.1	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	1/4	0.013 - 0.017	4.1	NA	63 N	NA	NA	No	BSL
79-01-6	Trichloroethene	0.088 J	120	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	4/4		120	NA	2.1 N <sup>(9)</sup>	NA	NA	Yes	ASL
75-69-4	Trichlorofluoromethane	1.8	7.4	ug/m <sup>3</sup>	DSY-SG-MW12-0506	4/4	_	7.4	NA	730 N	NA	NA	No	BSL
75-01-4	Vinyl Chloride	0.15 J	0.76	ug/m <sup>3</sup>	DSY-SG-MW02A-0708	4/4	_	0.76	NA	1.6 C	NA	NA	No	BSL

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL GAS - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available.
- 5 USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
- 6 Value is for 1,2,4-trimethylbenzene.
- 7 Value is for trans-1,2-dichloroethene.
- 8 Value is for m-xylene.
- 9 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

DSY-SG-MW12-0506

## **Associated Samples**

DSY-SG-MW02A-0708 DSY-SG-MW03-0608-D

DSY-SG-MW03-0608 DSY-SG-MW11A-0203

#### Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

## **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BSL = Below COPC Screening Level

NUT = Essential nutrient

NTX = No toxicity criteria

# TABLE 5-11 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Semivolatile Organic Compounds           108-60-1         2,2'-Oxybis(1-Chloropropane)         180 J         180 J         ug/kg         DSY-S-TP15-0001         1/6         330 - 400         180         NA           95-48-7         2-Methylphenol         83 J         83 J         ug/kg         DSY-S-TP17-0001         1/6         330 - 400         83         NA	4,600 C 310,000 N			Selection <sup>(7)</sup>
95-48-7 2-Methylphenol 83 J 83 J ug/kg DSY-S-TP17-0001 1/6 330 - 400 83 NA			1	1
	I 310 000 N	NA	No	BSL
		NA NA	No	BSL
106-44-5 4-Methylphenol 500 J 500 J ug/kg DSY-S-TP17-0001 1/6 330 - 400 500 NA	610,000 N	NA 40,000	No	BSL
83-32-9 Acenaphthene 92 J 92 J ug/kg DSY-S-TP15-0001 1/6 330 - 400 92 NA	340,000 N	43,000	No	BSL
120-12-7     Anthracene     130 J     130 J     ug/kg     DSY-S-TP15-0001     1/6     330 - 400     130     NA       56-55-3     Benzo(a)anthracene     140 J     410 J     ug/kg     DSY-S-TP15-0001     2/6     330 - 400     410     NA	1,700,000 N	35,000	No	BSL ASL
56-55-3         Benzo(a)anthracene         140 J         410 J         ug/kg         DSY-S-TP15-0001         2/6         330 - 400         410         NA           50-32-8         Benzo(a)pyrene         86 J         140 J         ug/kg         DSY-S-TP17-0001         2/6         330 - 400         140         NA	150 C 15 C	900 400	Yes Yes	ASL
205-99-2 Benzo(b)fluoranthene 230 J 410 J ug/kg DSY-S-TP15-0001 2/6 330 - 400 410 NA	150 C	900	Yes	ASL
	170,000 N <sup>(8)</sup>		No.	BSL
191-24-2     Benzo(g,h,i)perylene     110 J     130 J     ug/kg     DSY-S-TP17-0001     2/6     330 - 400     130     NA       207-08-9     Benzo(k)fluoranthene     360 J     360 J     ug/kg     DSY-S-TP15-0001     1/6     330 - 400     360     NA	1,500 C	900	No	BSL
86-74-8 Carbazole 97 J 97 J ug/kg DSY-S-TP15-0001 1/6 330 - 400 97 NA	NA	NA	No	NTX
218-01-9 <b>Chrysene</b> 120 J 420 J ug/kg DSY-S-TP15-0001 2/6 330 - 400 420 NA	15,000 C	400	Yes	ASL
206-44-0 Fluoranthene 330 J 870 J ug/kg DSY-S-TP15-0001 2/6 330 - 400 870 NA	230,000 N	20,000	No	BSL
86-73-7 Fluorene 65 J 65 J ug/kg DSY-S-TP15-0001 1/6 330 - 400 65 NA	230,000 N	28,000	No	BSL
193-39-5 Indeno(1,2,3-cd)pyrene 140 J 150 J ug/kg DSY-S-TP15-0001 2/6 330 - 400 150 NA	150 C	900	No	BSL
85-01-8 Phenanthrene 130 J 580 J ug/kg DSY-S-TP15-0001 2/6 330 - 400 580 NA	170,000 N <sup>(8)</sup>	40,000	No	BSL
108-95-2 Phenol 1,200 J 1,200 J ug/kg DSY-S-TP17-0001 1/6 330 - 400 1,200 NA	1,800,000 N	6,000,000	No	BSL
129-00-0 Pyrene 300 J 740 J ug/kg DSY-S-TP15-0001 2/6 330 - 400 740 NA	170,000 N	13,000	No	BSL
Pesticides/PCBs	,	,		
72-54-8 4,4'-DDD 4.3 4.3 ug/kg DSY-S-TP15-0001 1/6 3.3 - 4 4.3 NA	2,000 C	NA	No	BSL
50-29-3 4,4'-DDT 6.2 6.2 ug/kg DSY-S-TP15-0001 1/6 3.3 - 4 6.2 NA	1,700 C	NA	No	BSL
11096-82-5 Aroclor-1260 32 J 32 J ug/kg DSY-S-TP15-0001 1/6 33 - 40 32 NA	220 C	NA	No	BSL
Metals				
7429-90-5 Aluminum 5,820 13,200 mg/kg DSY-S-TP12-0001 6/6 - 13,200 16,020	7,700 N	NA	No	BKG
7440-38-2 Arsenic 3.9 24.4 mg/kg DSY-S-TP11-0001 6/6 - 24.4 <b>13</b>	0.39 C	7	Yes	ASL
7440-39-3 Barium 12.1 24 mg/kg DSY-S-TP15-0001 6/6 - 24 51	1,500 N	5,500	No	BSL, BKG
7440-41-7 Beryllium 0.23 J 0.47 mg/kg DSY-S-TP15-0001 6/6 - 0.47 0.58	16 N	1.5	No	BSL, BKG
7440-43-9 Cadmium 0.75 J 1 J mg/kg DSY-S-TP15-0001 4/6 0.48 - 0.61 1 0.17	7 N	39	No	BSL
7440-70-2 Calcium 426 J 1,130 J mg/kg DSY-S-MW07-0001 6/6 - 1,130 1,600	NA NA	NA (9)	No	NUT, BKG
7440-47-3 Chromium 9.6 18.2 mg/kg DSY-S-TP12-0001 6/6 - 18.2 16	0.29 C <sup>(9)</sup>		Yes	ASL
7440-48-4 Cobalt 7.6 J 14.7 mg/kg DSY-S-MW07-0001 6/6 - 14.7 9	2.3 N	NA 0.400	Yes	ASL
7440-50-8 Copper 15.1 31.8 mg/kg DSY-S-TP12-0001 6/6 - 31.8 12	310 N	3,100	No	BSL
7439-89-6 Iron 18,000 32,500 mg/kg DSY-S-TP12-0001 6/6 - 32,500 <b>24,200</b>	5,500 N	NA 150	Yes	ASL
7439-92-1         Lead         5.8 J         27.4         mg/kg         DSY-S-TP15-0001         6/6         -         27.4         40           7439-95-4         Magnesium         2,310         3,970         mg/kg         DSY-S-TP12-0001         6/6         -         3,970         2,571	400 NA	150 NA	No No	BSL, BKG
	180 N	390	Yes	NUT ASL
	2.3 N <sup>(10</sup>			
7439-97-6         Mercury         0.12         0.12         mg/kg         DSY-S-MW07-0001         1/6         0.05 - 0.13         0.12         0.18           7440-02-0         Nickel         14.5         27.1         mg/kg         DSY-S-TP12-0001         6/6         -         27.1         15			No	BSL, BKG
	150 N NA	1,000 NA	No No	BSL NUT, BKG
	39 N	390	No	BSL
7782-49-2         Selenium         0.74 J         1.2         mg/kg         DSY-S-TP15-0001         3/6         0.62 - 0.82         1.2         0.57           7440-23-5         Sodium         87.9         87.9         mg/kg         DSY-S-TP17-0001         1/6         22.6 - 69.7         87.9         231	NA NA	NA	No	NUT, BKG
7440-62-2 Vanadium 8.6 21.8 J mg/kg DSY-S-TP15-0001 1/6 22.6 - 69.7 87.9 231	39 N	550	No	BSL, BKG
7440-66-6 Zinc 32.7 J 71 mg/kg DSY-S-TP15-0001 6/6 - 71 <b>62</b>	2,300 N	6,000	No	BSL BSL

# OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Miscellaneo	us Parameters												
1461-25-2	Tetrabutyltin	8.8 J	8.8 J	ug/kg	DSY-S-TP15-0001	1/6	49 - 50	8.8	NA	1,800 N <sup>(11)</sup>	NA	No	BSL
56573-85-4	Tributyltin	4.8 J	4.8 J	ug/kg	DSY-S-TP15-0001	1/6	49 - 50	4.8	NA	1,800 N	NA	No	BSL

### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for pyrene.
- 9 Value is for hexavalent chromium.
- 10 Value is for mercuric chloride (and other mercury salts).
- 11 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

## **Associated Samples**

DSY-S-MW05-SS01

DSY-S-MW05-SS01-D

DSY-S-MW07-0001

DSY-S-TP11-0001

DSY-S-TP12-0001

DSY-S-TP15-0001 DSY-S-TP17-0001

## **Definitions:**

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

## **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

# TABLE 5-12 COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
	e Organic Compounds											
	2,2'-Oxybis(1-Chloropropane)	180 J	180 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	180	NA	0.11	NA	Yes
95-48-7	2-Methylphenol	83 J	83 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	83	NA	580	NA	No
106-44-5	4-Methylphenol	500 J	500 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	500	NA	1,100	NA	No
83-32-9	Acenaphthene	92 J	92 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	92	NA	4,100	NA	No
120-12-7	Anthracene	130 J	130 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	130	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	140 J	410 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	410	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	86 J	140 J	ug/kg	DSY-S-TP17-0001	2/6	330 - 400	140	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	230 J	410 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	410	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	110 J	130 J	ug/kg	DSY-S-TP17-0001	2/6	330 - 400	130	NA	9,500 <sup>(7)</sup>	NA	No
207-08-9	Benzo(k)fluoranthene	360 J	360 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	360	NA	350	NA	Yes
86-74-8	Carbazole	97 J	97 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	97	NA	NA	NA	No
218-01-9	Chrysene	120 J	420 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	420	NA	1,100	NA	No
206-44-0	Fluoranthene	330 J	870 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	870	NA	70,000	NA	No
86-73-7	Fluorene	65 J	65 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	65	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	140 J	150 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	150	NA	120	NA	Yes
85-01-8	Phenanthrene	130 J	580 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	580	NA	9,500 <sup>(7)</sup>	NA	No
108-95-2	Phenol	1,200 J	1,200 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	1,200	NA	2,600	NA	No
129-00-0	Pyrene	300 J	740 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	740	NA	9,500	NA	No
Pesticides/I	PCBs		•			•						•
72-54-8	4,4'-DDD	4.3	4.3	ug/kg	DSY-S-TP15-0001	1/6	3.3 - 4	4.3	NA	66	NA	No
50-29-3	4,4'-DDT	6.2	6.2	ug/kg	DSY-S-TP15-0001	1/6	3.3 - 4	6.2	NA	67	NA	No
11096-82-5	Aroclor-1260	32 J	32 J	ug/kg	DSY-S-TP15-0001	1/6	33 - 40	32	NA	24	NA	Yes
Metals												
7429-90-5	Aluminum	5,820	13,200	mg/kg	DSY-S-TP12-0001	6/6	-	13,200	16,020	23,000	NA	No
7440-38-2	Arsenic	3.9	24.4	mg/kg	DSY-S-TP11-0001	6/6	-	24.4	13	0.0013	NA	Yes
7440-39-3	Barium	12.1	24	mg/kg	DSY-S-TP15-0001	6/6	-	24	51	120	NA	No
7440-41-7	Beryllium	0.23 J	0.47	mg/kg	DSY-S-TP15-0001	6/6	-	0.47	0.58	13	NA	No
7440-43-9	Cadmium	0.75 J	1 J	mg/kg	DSY-S-TP15-0001	4/6	0.48 - 0.61	1	0.17	0.52	NA	Yes
7440-70-2		426 J	1,130 J	mg/kg	DSY-S-MW07-0001	6/6	-	1,130	1,600	NA	NA	No
7440-47-3	Chromium	9.6	18.2	mg/kg	DSY-S-TP12-0001	6/6	-	18.2	16	0.00059 <sup>(8)</sup>	NA	Yes
7440-48-4	Cobalt	7.6 J	14.7	mg/kg	DSY-S-MW07-0001	6/6	-	14.7	9	0.21	NA	Yes
7440-50-8	Copper	15.1	31.8	mg/kg	DSY-S-TP12-0001	6/6	-	31.8	12	22	NA	Yes
7439-89-6	Iron	18,000	32,500	mg/kg	DSY-S-TP12-0001	6/6	-	32,500	24,200	270	NA	Yes
7439-92-1	Lead	5.8 J	27.4	mg/kg	DSY-S-TP15-0001	6/6	-	27.4	40	14 <sup>(9)</sup>	NA	No
	Magnesium	2,310	3,970	mg/kg	DSY-S-TP12-0001	6/6	-	3,970	2,571	NA	NA	No
	Manganese	272	448	mg/kg	DSY-S-MW07-0001	6/6	-	448	349	21	NA	Yes
7439-97-6		0.12	0.12	mg/kg	DSY-S-MW07-0001	1/6	0.05 - 0.13	0.12	0.18	0.033	NA	No
7440-02-0	,	14.5	27.1	mg/kg	DSY-S-TP12-0001	6/6	-	27.1	15	20	NA	Yes
	Potassium	241	606	mg/kg	DSY-S-TP17-0001	6/6	-	606	651	NA	NA	No
7782-49-2		0.74 J	1.2	mg/kg	DSY-S-TP15-0001	3/6	0.62 - 0.82	1.2	0.57	0.4	NA	Yes
7440-23-5		87.9	87.9	mg/kg	DSY-S-TP17-0001	1/6	22.6 - 69.7	87.9	231	NA	NA	No
7440-62-2	Vanadium	8.6	21.8 J	mg/kg	DSY-S-TP15-0001	6/6	-	21.8	34	78	NA	No
7440-66-6	Zinc	32.7 J	71	mg/kg	DSY-S-TP15-0001	6/6	-	71	62	290	NA	No

## COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
Miscellaneo	us Parameters											
1461-25-2	Tetrabutyltin	8.8 J	8.8 J	ug/kg	DSY-S-TP15-0001	1/6	49 - 50	8.8	NA	NA	NA	No
56573-85-4	Tributyltin	4.8 J	4.8 J	ug/kg	DSY-S-TP15-0001	1/6	49 - 50	4.8	NA	NA	NA	No
TCLP Metals	5											
7440-38-2	Arsenic	4.6 J	5.7 J	ug/L	DSY-S-MW07-0001	1/6	4 - 5.3	5.7	NA	NA	NA	No
7440-39-3	Barium	186	306	ug/L	DSY-S-TP12-0001	2/6	87.1 - 724	306	NA	NA	23,000	No
7439-92-1	Lead	12.8	21.1	ug/L	DSY-S-TP15-0001	3/6	1 - 1.8	21.1	NA	NA	40	No
7782-49-2	Selenium	4	7.7	ug/L	DSY-S-TP12-0001	2/6	4 - 4	7.7	NA	NA	600	No

## Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
- 6 Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 7 Value is for pyrene.
- 8 Value is for hexavalent chromium.
- 9 Value is MCL based soil screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

## **Associated Samples**

DSY-S-MW05-SS01

DSY-S-MW05-SS01-D

DSY-S-MW07-0001

DSY-S-TP11-0001

DSY-S-TP12-0001

DSY-S-TP15-0001

DSY-S-TP17-0001

## **Definitions:**

C = Carcinogen

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

# TABLE 5-13 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Rationale for **RIDEM Residential** Concentration Adjusted Frequency Minimum Range of **Background** Maximum Contaminant CAS Sample of Maximum COPC **USEPA RSL Used for Direct Exposure** Chemical Units of Concentration<sup>(1)</sup> Concentration<sup>(4)</sup> Number Concentration<sup>(1)</sup> Concentration Nondetects<sup>(2)</sup> Flag **Deletion or** Residential Soil<sup>(5)</sup> Criteria<sup>(6)</sup> Screening<sup>(3)</sup> **Detection** Selection<sup>(7)</sup> Volatile Organic Compounds 67-64-1 Acetone N1-250 7.800.000 7 B 110 B 17/35 11 - 110 110 NA 6.100.000 N No **BSL** ug/kg 75-15-0 Carbon Disulfide 4 J 4 J DSY-S-MW07-2224 1/18 11 - 13 NA 82.000 N No **BSL** ug/kg 4 NA 75-09-2 Methylene Chloride 1 JB 1 JB ug/kg N1-A, N1-E, S42 SWN 3/21 11 - 34 1 NA 11.000 C 45,000 No BSL 108-88-3 Toluene 0.9 J 10 J S42 SWW 3/20 11 - 13 10 NA 500,000 N 190,000 No **BSL** ug/kg 1330-20-7 Total Xylenes S42 SWN NA 1/19 11 - 13 63.000 N 110.000 No **BSL** 1 J 1 J ug/kg Semivolatile Organic Compounds 50 J 280 J DSY-S-MW07-0810 3/18 340 - 4000 280 23,000 N 123,000 BSL 91-57-6 2-Methylnaphthalene ug/kg NA No 83-32-9 Acenaphthene 41 J 270 J N1-B 3/21 340 - 4000 270 NA 340,000 N 43,000 No BSL ug/kg S42 SWN 43 J 43 J 1/19 340 - 4000 43 NA 340.000 N<sup>(8</sup> 23,000 No **BSL** 208-96-8 Acenaphthylene ug/kg 120-12-7 Anthracene 48 J 490 ug/kg N1-B 5/23 340 - 4000 490 NA 1,700,000 N 35,000 No BSL N1-B 1,300 NA 56-55-3 Benzo(a)anthracene 47 J 1,300 ug/kg 10/25 340 - 4000 150 C 900 Yes **ASL** Benzo(a)pyrene 42 J N1-B 690 NA ASL 50-32-8 690 11/25 340 - 4000 15 C 400 Yes ug/kg N1-B 205-99-2 Benzo(b)fluoranthene 63 J 910 ug/kg 11/25 340 - 4000 910 NA 150 C 900 Yes **ASL** S42 SWN 250 191-24-2 Benzo(g,h,i)perylene 56 J 250 J 4/21 340 - 4000 NA 170,000 N<sup>(9)</sup> 800 No **BSL** ug/kg 207-08-9 Benzo(k)fluoranthene 42 J 350 N1-B 7/24 340 - 4000 350 NA 1.500 C 900 No **BSL** ug/kg DPSOIL02 NA 117-81-7 Bis(2-ethylhexyl)phthalate 39 J 160 J 5/23 340 - 4000 160 35.000 C 46.000 No BSL ug/kg DSY-SB-09-1416 85-68-7 Butyl Benzyl Phthalate 48 J 48 J ug/kg 1/18 340 - 4000 48 NA 260,000 C NA No **BSL** N1-B 12/25 340 - 4000 1.300 218-01-9 Chrysene 51 J 1,300 NA 15.000 C 400 Yes ASL ug/kg N1-250 NA 53-70-3 46 J 46 J 1/19 340 - 4000 46 ASL Dibenzo(a,h)anthracene ug/kg 15 C 400 Yes 206-44-0 Fluoranthene 41 J 4.400 ug/kg N1-B 17/30 340 - 4000 4.400 NA 230,000 N 20,000 No **BSL** N1-B 3/21 340 - 4000 730 44 J 730 230,000 N 28.000 **BSL** 86-73-7 Fluorene ua/ka NA No 193-39-5 Indeno(1,2,3-cd)pyrene 62 J 240 J S42 SWN 4/22 340 - 4000 240 NA 150 C 900 Yes ASL ug/kg 77 J DPSOIL02 3/20 340 - 4000 77 NA 3,600 C 54,000 BSL 91-20-3 Naphthalene 1 J ug/kg No 37 J 5,200 5,200 NA 40.000 No **BSL** 85-01-8 Phenanthrene ug/kg N1-B 14/26 340 - 4000 170.000 N<sup>(9</sup> 129-00-0 Pyrene 34 J 3.000 ug/kg N1-B 17/30 340 - 4000 3.000 NA 170,000 N 13.000 No **BSL** Pesticides/PCBs 220 J DSY-S-MW07-1618-D 3/18 220 2,000 C BSL 72-54-8 4,4'-DDD 7.4 J ug/kg 3.4 - 5.3NA NA No 72-55-9 4.4'-DDE DSY-S-MW07-1618-D 3.4 - 5.3 NA 1.400 C No **BSL** 11 J 11 J ua/ka 1/18 11 NA 50-29-3 4,4'-DDT 100 J 100 J DSY-S-MW07-1618-D 1/18 3.4 - 5.3 100 NA NA No BSL ug/kg 1,700 C 11096-82-5 Aroclor-1260 13 J 13 J ug/kg DSY-S-TP25-1011 1/18 34 - 53 13 NA 220 C NA No BSL 58 P 100 100 2/2 NA 220 C 10,000 No **BSL** 1336-36-3 Total Aroclors ug/kg S42 SWN 72-20-8 5.5 5.5 DSY-S-TP11-1213 1/18 3.4 - 5.3 5.5 NA 1,800 N NA No BSL ug/kg Endrin Metals 7429-90-5 **Aluminum** 4,820 14,300 DSY-S-TP12-1213 27/27 14.300 13,075 7,700 N NA Yes **ASL** mg/kg DSY-S-TP12-1213 7440-38-2 **Arsenic** 3.9 37.3 mg/kg 43/44 4.1 - 4.1 37.3 20 0.39 C Yes ASL 6.3 37 S42 SWN 42/44 2.6 - 4.1 37 BSL 7440-39-3 Barium mg/kg 36 1,500 N 5,500 No 7440-41-7 Beryllium 0.22 J 0.54 DSY-S-TP13-1011 0.54 23/27 0.18 - 0.230.64 16 N 1.5 No BSL. BKG mg/kg 7440-43-9 Cadmium 0.23 0.7 J 2.8 mg/kg N1-0 24/44 0.51 - 1.32.8 7 N 39 No BSL 363 J 3,630 J DSY-SB-09-1416 27/27 3,630 1,689 NA NUT 7440-70-2 Calcium mg/kg NA No 7440-47-3 **Chromium** 6.3 J 22 N1-0 44/44 22 18 0.29 C<sup>(10</sup> 390 <sup>(</sup> Yes ASL mg/kg \_ 7440-48-4 Cobalt 3.9 J 20.2 J DSY-S-TP11-1213 27/27 20.2 2.3 N ASL mg/kg 17 NA Yes 7440-50-8 Copper 5.1 J 27.9 DSY-S-TP25-0507 27/27 27.9 24 310 N 3,100 No BSL mg/kg 40,100 5,500 N Yes 7439-89-6 Iron 14,300 40,100 mg/kg DSY-S-TP11-1213 27/27 39,173 NA **ASL** 

# OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	IISEDA PSI	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
7439-92-1	Lead	2.1 J	45	mg/kg	N1-E	44/44	ı	45	12	400	150	No	BSL
7439-95-4	Magnesium	1,900	4,530	mg/kg	DSY-S-TP12-1213	27/27		4,530	3,811	NA	NA	No	NUT
Metals (con	tinued)												
7439-96-5	Manganese	86.2 J	612 J	mg/kg	DSY-S-TP11-1213	27/27	-	612	1,037	180 N	390	No	BKG
7439-97-6	Mercury	0.07	0.15	mg/kg	DSY-S-MW07-1618-D	2/27	0.04 - 0.13	0.15	0.012	2.3 N <sup>(11)</sup>	23	No	BSL
7440-02-0	Nickel	10.4 J	33.1	mg/kg	DSY-S-TP11-1213	27/27	-	33.1	28	150 N	1,000	No	BSL
7440-09-7	Potassium	190	658	mg/kg	DSY-SB-14-0103-D	27/27	179 - 179	658	1,699	NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.83 J	1.4	mg/kg	DSY-S-TP13-0506	4/25	0.68 - 1.1	1.4	0.286	39 N	390	No	BSL
7440-22-4	Silver	1.6 J	5	mg/kg	N1-0	10/36	1 - 1.6	5	0.12	39 N	200	No	BSL
7440-23-5	Sodium	82.8	228	mg/kg	DSY-S-MW07-3436	3/27	21.4 - 143	228	83	NA	NA	No	NUT
7440-62-2	Vanadium	8.9 J	22.8 J	mg/kg	DSY-SB-10-1416	27/27	-	22.8	23	39 N	550	No	BSL, BKG
7440-66-6	Zinc	28 J	82.5	mg/kg	DSY-SB-03-0911	27/27	-	82.5	66	2,300 N	6,000	No	BSL
Miscellaneo	us Parameters												
1461-25-2	Tetrabutyltin	4.6 J	27 J	ug/kg	DSY-S-TP13-0506	1/18	49 - 50	27	NA	1,800 N <sup>(12)</sup>	NA	No	BSL
56573-85-4	Tributyltin	4.9 J	4.9 J	ug/kg	DSY-S-MW05-1012	1/18	49 - 50	4.9	NA	1,800 N	NA	No	BSL

### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for acenaphthene.
- 9 Value is for pyrene.
- 10 Value is for hexavalent chromium.
- 11 Value is for mercuric chloride (and other mercury salts).
- 12 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

## **Associated Samples**

Associated Campies					
DSY-S-MW04-3234	DSY-S-MW07-3436	N1-C	DSY-SB-01-0911	DSY-S-TP12-0507	
DSY-S-MW05-1012	N1-0	N1-D	DSY-SB-03-0911	DSY-S-TP12-1213	
DSY-S-MW05-2224	N1-100	N1-E	DSY-SB-09-1416	DSY-S-TP13-0506	
DSY-S-MW05-3234	N1-150	S1	DSY-SB-10-1416	DSY-S-TP13-0506-D	
DSY-S-MW05-4446	N1-200	S42 BOT	DSY-SB-14-0103	DSY-S-TP13-1011	
DSY-S-MW07-0810	N1-250	S42 SWE	DSY-SB-14-0103-D	DSY-S-TP15-0506	
DSY-S-MW07-1618	N1-50	S42 SWN	DSY-SB-15-0103	DSY-S-TP15-1112	
DSY-S-MW07-1618-D	N1-A	S42 SWS	DSY-S-TP11-0507	DSY-S-TP17-0507	
DSY-S-MW07-2224	N1-B	S42 SWW	DSY-S-TP11-1213	DSY-S-TP17-1112	

## **Definitions:**

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

### **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

DSY-S-TP25-0507 DSY-S-TP25-1011

DPSOIL02

# TABLE 5-14 COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
Volatile Org	ganic Compounds				•	•				•		<u> </u>
67-64-1	Acetone	7 B	110 B	ug/kg	N1-250	17/35	11 - 110	110	NA	2,400	NA	No
75-15-0	Carbon Disulfide	4 J	4 J	ug/kg	DSY-S-MW07-2224	1/18	11 - 13	4	NA	210	NA	No
75-09-2	Methylene Chloride	1 JB	1 JB	ug/kg	N1-A, N1-E, S42 SWN	3/21	11 - 34	1	NA	2.5	NA	No
108-88-3	Toluene	0.9 J	10 J	ug/kg	S42 SWW	3/20	11 - 13	10	NA	590	32,000	No
1330-20-7	Total Xylenes	1 J	1 J	ug/kg	S42 SWN	1/19	11 - 13	1	NA	190	540,000	No
	e Organic Compounds											
	2-Methylnaphthalene	50 J	280 J	ug/kg	DSY-S-MW07-0810	3/18	340 - 4000	280	NA	140	NA	Yes
83-32-9	Acenaphthene	41 J	270 J	ug/kg	N1-B	3/21	340 - 4000	270	NA	4,100	NA	No
208-96-8	Acenaphthylene	43 J	43 J	ug/kg	S42 SWN	1/19	340 - 4000	43	NA	4,100 <sup>(8)</sup>	NA	No
120-12-7	Anthracene	48 J	490	ug/kg	N1-B	5/23	340 - 4000	490	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	47 J	1,300	ug/kg	N1-B	10/25	340 - 4000	1,300	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	42 J	690	ug/kg	N1-B	11/25	340 - 4000	690	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	63 J	910	ug/kg	N1-B	11/25	340 - 4000	910	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	56 J	250 J	ug/kg	S42 SWN	4/21	340 - 4000	250	NA	9,500 <sup>(9)</sup>	NA	No
207-08-9	Benzo(k)fluoranthene	42 J	350	ug/kg	N1-B	7/24	340 - 4000	350	NA	350	NA	No
117-81-7	Bis(2-ethylhexyl)phthalate	39 J	160 J	ug/kg	DPSOIL02	5/23	340 - 4000	160	NA	17	120,000	Yes
85-68-7	Butyl Benzyl Phthalate	48 J	48 J	ug/kg	DSY-SB-09-1416	1/18	340 - 4000	48	NA	200	NA	No
218-01-9	Chrysene	51 J	1,300	ug/kg	N1-B	12/25	340 - 4000	1,300	NA	1,100	NA	Yes
53-70-3	Dibenzo(a,h)anthracene	46 J	46 J	ug/kg	N1-250	1/19	340 - 4000	46	NA	11	NA	Yes
206-44-0	Fluoranthene	41 J	4,400	ug/kg	N1-B	17/30	340 - 4000	4,400	NA	70,000	NA	No
86-73-7	Fluorene	44 J	730	ug/kg	N1-B	3/21	340 - 4000	730	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	62 J	240 J	ug/kg	S42 SWN	4/22	340 - 4000	240	NA	120	NA	Yes
91-20-3	Naphthalene	1 J	77 J	ug/kg	DPSOIL02	3/20	340 - 4000	77	NA	0.47	800	Yes
85-01-8	Phenanthrene	37 J	5,200	ug/kg	N1-B	14/26	340 - 4000	5,200	NA	9,500 (9)	NA	No
	Pyrene	34 J	3,000	ug/kg	N1-B	17/30	340 - 4000	3,000	NA	9,500	NA	No
Pesticides/												
	4,4'-DDD	7.4 J	220 J	ug/kg	DSY-S-MW07-1618-D	3/18	3.4 - 5.3	220	NA	66	NA	Yes
72-55-9	4,4'-DDE	11 J	11 J	ug/kg	DSY-S-MW07-1618-D	1/18	3.4 - 5.3	11	NA	46	NA	No
50-29-3	4,4'-DDT	100 J	100 J	ug/kg	DSY-S-MW07-1618-D	1/18	3.4 - 5.3	100	NA	67	NA	Yes
	Aroclor-1260	13 J	13 J	ug/kg	DSY-S-TP25-1011	1/18	34 - 53	13	NA	24	NA	No
	Total Aroclors	58 P	100	ug/kg	S42 SWN	2/2	-	100	NA	26	10,000	Yes
72-20-8	Endrin	5.5	5.5	ug/kg	DSY-S-TP11-1213	1/18	3.4 - 5.3	5.5	NA	68	NA	No
Metals		<u>,                                      </u>			T							
7429-90-5		4820	14,300	mg/kg	DSY-S-TP12-1213	27/27	-	14,300	13,075	23,000	NA	No
7440-38-2		3.9	37.3	mg/kg	DSY-S-TP12-1213	43/44	4.1 - 4.1	37.3	20	0.0013	NA	Yes
7440-39-3		6.3	37	mg/kg	S42 SWN	42/44	2.6 - 4.1	37	36	120	NA	No
7440-41-7	, ,	0.22 J	0.54	mg/kg	DSY-S-TP13-1011	23/27	0.18 - 0.23	0.54	0.64	13	NA	No
	Cadmium	0.7 J	2.8	mg/kg	N1-0	24/44	0.51 - 1.3	2.8	0.23	0.52	NA	Yes
7440-70-2		363 J	3,630 J	mg/kg	DSY-SB-09-1416	27/27	-	3,630	1,689	NA (10)	NA	No
	Chromium	6.3 J	22	mg/kg	N1-0	44/44	-	22	18	0.00059 <sup>(10)</sup>	NA	Yes
7440-48-4		3.9 J	20.2 J	mg/kg	DSY-S-TP11-1213	27/27	-	20.2	17	0.21	NA	Yes
7440-50-8	Copper	5.1 J	27.9	mg/kg	DSY-S-TP25-0507	27/27	-	27.9	24	22	NA	Yes

# COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
Metals (cont	inued)											
7439-89-6	Iron	14300	40,100	mg/kg	DSY-S-TP11-1213	27/27	-	40,100	39,173	270	NA	Yes
7439-92-1	Lead	2.1 J	45	mg/kg	N1-E	44/44	-	45	12	<b>14</b> <sup>(11)</sup>	NA	Yes
7439-95-4	Magnesium	1900	4,530	mg/kg	DSY-S-TP12-1213	27/27	-	4,530	3,811	NA	NA	No
7439-96-5	Manganese	86.2 J	612 J	mg/kg	DSY-S-TP11-1213	27/27	-	612	1,037	21	NA	No
7439-97-6	Mercury	0.07	0.15	mg/kg	DSY-S-MW07-1618-D	2/27	0.04 - 0.13	0.15	0.012	0.033	NA	Yes
7440-02-0	Nickel	10.4 J	33.1	mg/kg	DSY-S-TP11-1213	27/27	-	33.1	28	20	NA	Yes
7440-09-7	Potassium	190	658	mg/kg	DSY-SB-14-0103-D	27/27	179 - 179	658	1,699	NA	NA	No
7782-49-2	Selenium	0.83 J	1.4	mg/kg	DSY-S-TP13-0506	4/25	0.68 - 1.1	1.4	0.286	0.4	NA	Yes
7440-22-4	Silver	1.6 J	5	mg/kg	N1-0	10/36	1 - 1.6	5	0.12	0.6	NA	Yes
7440-23-5	Sodium	82.8	228	mg/kg	DSY-S-MW07-3436	3/27	21.4 - 143	228	83	NA	NA	No
7440-62-2	Vanadium	8.9 J	22.8 J	mg/kg	DSY-SB-10-1416	27/27	-	22.8	23	78	NA	No
7440-66-6	Zinc	28 J	82.5	mg/kg	DSY-SB-03-0911	27/27	-	82.5	66	290	NA	No
Miscellaneou	us Parameters											
1461-25-2	Tetrabutyltin	4.6 J	27 J	ug/kg	DSY-S-TP13-0506	1/18	49 - 50	27	NA	NA	NA	No
56573-85-4	Tributyltin	4.9 J	4.9 J	ug/kg	DSY-S-MW05-1012	1/18	49 - 50	4.9	NA	NA	NA	No
<b>TCLP Metals</b>	•											
7440-38-2	Arsenic	4.2 J	67.2	ug/L	DSY-S-TP11-1213	9/18	4 - 24.3	67.2	NA	NA	NA	No
7440-39-3	Barium	283	415	ug/L	DSY-S-MW04-3234	3/18	75 - 806	415	NA	NA	23,000	No
7440-47-3	Chromium	7.3 J	29.5 J	ug/L	DSY-SB-10-1416	6/18	6 - 18.2	29.5	NA	NA	1,100	No
7439-92-1	Lead	5	56.2	ug/L	DSY-S-TP11-1213	5/18	1 - 38.1	56.2	NA	NA	40	Yes
7782-49-2	Selenium	18	18	ug/L	DSY-S-TP11-1213	1/18	4 - 6.9	18	NA	NA	600	No

## Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
- 6 Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for acenaphthene.
- 9 Value is for pyrene.
- 10 Value is for hexavalent chromium.
- 11 Value is MCL based soil screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

## **Definitions:**

J = Estimated value

NA = Not Applicable/Not Available

## TABLE 5-14 COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - CENTRAL SHIPYARD

DPSOIL02

DSY-SB-14-0103

N1-50

## FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

RIDEM GA

Leachability

Criteria<sup>(6)</sup>

**Exceeds** 

Screening

Criteria?

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	ı
Associated S	amples										
DSY-S-MW04	•	N1-A	DSY	'-SB-14-010	)3-D						
DSY-S-MW05		N1-B		'-SB-15-010							
DSY-S-MW05	5-2224	N1-C	DSY	'-S-TP11-05	507						
DSY-S-MW05	-3234	N1-D	DSY	'-S-TP11-12	213						
DSY-S-MW05		N1-E	DSY	'-S-TP12-05	507						
DSY-S-MW07	'-0810	S1	DSY	/-S-TP12-12	213						
DSY-S-MW07	'-1618	S42 BOT	DSY	'-S-TP13-05	506						
DSY-S-MW07	'-1618-D	S42 SWE	DSY	'-S-TP13-05	506-D						
DSY-S-MW07	7-2224	S42 SWN	DSY	'-S-TP13-10	)11						
DSY-S-MW07	7-3436	S42 SWS	DSY	'-S-TP15-05	506						
N1-0		S42 SWW	DSY	'-S-TP15-11	12						
N1-100		DSY-SB-01-0911	DSY	'-S-TP17-05	507						
N1-150		DSY-SB-03-0911	DSY	'-S-TP17-11	12						
N1-200		DSY-SB-09-1416	DSY	'-S-TP25-05	507						
N1-250		DSY-SB-10-1416	DSY	'-S-TP25-10	)11						

# OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

## PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Volatile Org	anic Compounds						•							
	Acetone	3.28 J	3.28 J	ug/L	DSY-GW-MW219-031611-D	1/4	5 - 10	3.28	NA	1,200 N	NA NA	NA NA	No	BSL
Metals (Tota			T			T		T	T					
7429-90-5		52.9	1,240	ug/L	DSY-A-MW07-01	3/4	16 - 16	1,240	NA	1,600 N	<b>50 - 200</b> NA	EPA-SDWR NA	Yes	ASL
7440-38-2	Arsenic	27.8	78.1 J	ug/L	DSY-GW-MW219-031611-D	3/4	4 - 4	78.1	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
7440-39-3	Barium	34	86.6	ug/L	DSY-GW-MW218-030111	4/4	-	86.6	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
7440-43-9	Cadmium	1.41	1.53	ug/L	DSY-GW-MW219-031611	1/4	0.5 - 3	1.53	NA	0.69 N	5 5	EPA-MCL RIDEM	Yes	ASL
7440-70-2	Calcium	14,100	126,000	ug/L	DSY-A-MW05-01	4/4	-	126,000	NA	NA	NA NA	NA NA	No	NUT
7440-47-3	Chromium	12.8 J	12.8 J	ug/L	DSY-A-MW07-01	1/4	1 - 6	12.8	NA	0.031 C	100 100	EPA-MCL RIDEM	Yes	ASL
7440-48-4	Cobalt	13.7	24.8	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 4.5	24.8	NA	0.47 N	NA NA	NA NA	Yes	ASL
7439-89-6	Iron	1,260	65,800 J	ug/L	DSY-GW-MW219-031611-D	4/4	-	65,800	NA	1,100 N	<b>300</b> NA	EPA-SDWR NA	Yes	ASL
7439-92-1	Lead	1.07 J	1.8 J	ug/L	DSY-A-MW07-01	2/4	1 - 3.75	1.8	NA	NA	15 15	EPA-MCL RIDEM	No	BSL
7439-95-4	Magnesium	5,430	40,000	ug/L	DSY-A-MW05-01	4/4	-	40,000	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	753	9,100	ug/L	DSY-GW-MW218-030111	4/4	-	9,100	NA	32 N	<b>50</b> NA	EPA-SDWR NA	Yes	ASL
7440-02-0	Nickel	4.64	4.64	ug/L	DSY-GW-MW218-030111	1/4	1.5 - 11.3	4.64	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	2,490	11,000	ug/L	DSY-GW-MW218-030111	4/4	-	11,000	NA	NA	NA NA	NA NA	No	NUT
7782-49-2	Selenium	1.24 J	1.55 J	ug/L	DSY-GW-MW219-031611	1/4	4 - 6.25	1.55	NA	7.8 N	50 50	EPA-MCL RIDEM	No	BSL
7440-23-5	Sodium	34,400	379,000	ug/L	DSY-A-MW05-01	4/4	-	379,000	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	1.52 J	3.59 J	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 26.4	3.59	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
Metals (Diss	solved)	<u> </u>				ı	1	1	1		14/1	14/1		
7429-90-5		29.7 J	38 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	38	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	No	BSL
7440-38-2	Arsenic	29.1	78.9 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	78.9	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
7440-39-3	Barium	33.7	84.4	ug/L	DSY-GW-MW218-030111	2/2	-	84.4	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
7440-43-9	Cadmium	1.52	1.62	ug/L	DSY-GW-MW219-031611	1/2	0.5 - 0.5	1.62	NA	0.69 N	5 5	EPA-MCL RIDEM	Yes	ASL
7440-70-2	Calcium	39,000 J	76,600	ug/L	DSY-GW-MW218-030111	2/2	-	76,600	NA	NA	NA NA	NA NA	No	NUT

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

#### PAGE 2 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Dissolved N	Metals (Continued)				•						•			
7440-48-4	Cobalt	13.6	24.2	ug/L	DSY-GW-MW218-030111	2/2	-	24.2	NA	0.47 N	NA NA	NA NA	Yes	ASL
7439-89-6	Iron	9,900	63,900 J	ug/L	DSY-GW-MW219-031611	2/2	-	63,900	NA	1,100 N	<b>300</b> NA	EPA-SDWR NA	Yes	ASL
7439-92-1	Lead	0.488 J	0.667 J	ug/L	DSY-GW-MW219-031611	1/2	3.75 - 3.75	0.667	NA	NA	15 15	EPA-MCL RIDEM	No	BSL
7439-95-4	Magnesium	8,090 J	16,200	ug/L	DSY-GW-MW218-030111	2/2	-	16,200	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	4,610	8,680	ug/L	DSY-GW-MW218-030111	2/2	-	8,680	NA	32 N	<b>50</b> NA	EPA-SDWR NA	Yes	ASL
7440-02-0	Nickel	4.73	4.73	ug/L	DSY-GW-MW218-030111	1/2	1.75 - 1.75	4.73	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	6,240	10,800	ug/L	DSY-GW-MW218-030111	2/2	-	10,800	NA	NA	NA NA	NA NA	No	NUT
7782-49-2	Selenium	1.34 J	1.44 J	ug/L	DSY-GW-MW219-031611-D	1/2	6.25 - 6.25	1.44	NA	7.8 N	50 50	EPA-MCL RIDEM	No	BSL
7440-23-5	Sodium	35,800	61,900	ug/L	DSY-GW-MW218-030111	2/2	-	61,900	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	3.5 J	3.5 J	ug/L	DSY-GW-MW218-030111	1/2	2.5 - 2.5	3.5	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL

#### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

## **Associated Samples**

DSY-A-MW05-01 DSY-A-MW07-01 DSY-GW-MW218-030111 DSY-GW-MW219-031611-D DSY-GW-MW219-031611-AVG

### **Definitions:**

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

CAS = Chemical Abstracts Service

COPC = Chemical Of Potential Concern

EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)

EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

RIDEM = Rhode Island Department of Environmental Management GA Groundwater Objective (November, 2011).

## **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Screening Toxicity Value <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Volatile Orga	anic Compounds							_	_					
67-64-1	Acetone	3.28 J	3.28 J	ug/L	DSY-GW-MW219-031611-D	1/4	5 - 10	3.28	NA	2,300,000 N	NA	NA	No	BSL
Metals												-		
7429-90-5	Aluminum	52.9	1,240	ug/L	DSY-A-MW07-01	3/4	16 - 16	1,240	NA	NA	NA	NA	No	NTX
7440-38-2	Arsenic	27.8	78.1 J	ug/L	DSY-GW-MW219-031611-D	3/4	4 - 4	78.1	NA	NA	NA	NA	No	NTX
7440-39-3	Barium	34	86.6	ug/L	DSY-GW-MW218-030111	4/4	-	86.6	NA	NA	NA	NA	No	NTX
7440-43-9	Cadmium	1.41	1.53	ug/L	DSY-GW-MW219-031611	1/4	0.5 - 3	1.53	NA	NA	NA	NA	No	NTX
7440-70-2	Calcium	14,100	126,000	ug/L	DSY-A-MW05-01	4/4	-	126,000	NA	NA	NA	NA	No	NUT
7440-47-3	Chromium	12.8 J	12.8 J	ug/L	DSY-A-MW07-01	1/4	1 - 6	12.8	NA	NA	NA	NA	No	NTX
7440-48-4	Cobalt	13.7	24.8	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 4.5	24.8	NA	NA	NA	NA	No	NTX
7439-89-6	Iron	1,260	65,800 J	ug/L	DSY-GW-MW219-031611-D	4/4	-	65,800	NA	NA	NA	NA	No	NTX
7439-92-1	Lead	1.07 J	1.8 J	ug/L	DSY-A-MW07-01	2/4	1 - 3.75	1.8	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	5,430	40,000	ug/L	DSY-A-MW05-01	4/4	-	40,000	NA	NA	NA	NA	No	NUT
7439-96-5	Manganese	753	9,100	ug/L	DSY-GW-MW218-030111	4/4	-	9,100	NA	NA	NA	NA	No	NTX
7440-02-0	Nickel	4.64	4.64	ug/L	DSY-GW-MW218-030111	1/4	1.5 - 11.3	4.64	NA	NA	NA	NA	No	NTX
7440-09-7	Potassium	2,490	11,000	ug/L	DSY-GW-MW218-030111	4/4	-	11,000	NA	NA	NA	NA	No	NUT
7782-49-2	Selenium	1.24 J	1.55 J	ug/L	DSY-GW-MW219-031611	1/4	4 - 6.25	1.55	NA	NA	NA	NA	No	NTX
7440-23-5	Sodium	34,400	379,000	ug/L	DSY-A-MW05-01	4/4	-	379,000	NA	NA	NA	NA	No	NUT
7440-66-6	Zinc	1.52 J	3.59 J	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 26.4	3.59	NA	NA	NA	NA	No	NTX
Dissolved M	etals	•				•			•					
7429-90-5	Aluminum	29.7 J	38 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	38	NA	NA	NA	NA	No	NTX
7440-38-2	Arsenic	29.1	78.9 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	78.9	NA	NA	NA	NA	No	NTX
7440-39-3	Barium	33.7	84.4	ug/L	DSY-GW-MW218-030111	2/2	-	84.4	NA	NA	NA	NA	No	NTX
7440-43-9	Cadmium	1.52	1.62	ug/L	DSY-GW-MW219-031611	1/2	0.5 - 0.5	1.62	NA	NA	NA	NA	No	NTX
7440-70-2	Calcium	39,000 J	76,600	ug/L	DSY-GW-MW218-030111	2/2	-	76,600	NA	NA	NA	NA	No	NUT
7440-48-4	Cobalt	13.6	24.2	ug/L	DSY-GW-MW218-030111	2/2	-	24.2	NA	NA	NA	NA	No	NTX
7439-89-6	Iron	9,900	63,900 J	ug/L	DSY-GW-MW219-031611	2/2	-	63,900	NA	NA	NA	NA	No	NTX
7439-92-1	Lead	0.488 J	0.667 J	ug/L	DSY-GW-MW219-031611	1/2	3.75 - 3.75	0.667	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	8,090 J	16,200	ug/L	DSY-GW-MW218-030111	2/2	-	16,200	NA	NA	NA	NA	No	NUT
7439-96-5	Manganese	4,610	8,680	ug/L	DSY-GW-MW218-030111	2/2	-	8,680	NA	NA	NA	NA	No	NTX
7440-02-0	Nickel	4.73	4.73	ug/L	DSY-GW-MW218-030111	1/2	1.75 - 1.75	4.73	NA	NA	NA	NA	No	NTX
7440-09-7	Potassium	6,240	10,800	ug/L	DSY-GW-MW218-030111	2/2	-	10,800	NA	NA	NA	NA	No	NUT
7782-49-2	Selenium	1.34 J	1.44 J	ug/L	DSY-GW-MW219-031611-D	1/2	6.25 - 6.25	1.44	NA	NA	NA	NA	No	NTX
	Sodium	35,800	61,900	ug/L	DSY-GW-MW218-030111	2/2	-	61,900	NA	NA	NA	NA	No	NUT
7440-66-6		3.5 J	3.5 J	ug/L	DSY-GW-MW218-030111	1/2	2.5 - 2.5	3.5	NA	NA	NA	NA	No	NTX

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

## PAGE 2 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Screening Toxicity Value <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
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#### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs. Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

## **Associated Samples**

DSY-A-MW05-01 DSY-A-MW07-01 DSY-GW-MW218-030111 DSY-GW-MW219-031611 DSY-GW-MW219-031611-D

## Definitions:

 ${\sf ARAR/TBC} = {\sf Applicable} \ \ {\sf or} \ \ {\sf Relevant} \ \ {\sf and} \ \ {\sf Appropriate} \ \ {\sf Requirements} \ \ {\sf To} \ \ {\sf Be} \ \ {\sf Considered}$ 

C = Carcinogen

CAS = Chemical Abstracts Service

COPC = Chemical Of Potential Concern

J = Estimated value

NA = Not Applicable/Not Available

## **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

NVT = Not sufficiently volatile and/or toxic to pose inhalation risk.

# TABLE 5-17 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD

## NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

## PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
	anic Compounds											<u> </u>	
	Toluene	1 J	2 J	ug/kg	DSY-S-TP08-0001	2/7	10 - 11	2	NA	500,000 N	190,000	No	BSL
	Total Xylenes	3 J	3 J	ug/kg	DSY-S-MW08-SS01	1/7	10 - 11	3	NA	63,000 N	110,000	No	BSL
	Organic Compounds										T		
	Acenaphthene	46 J	52 J	ug/kg	DSY-S-MW08-SS01	2/7	340 - 1700	52	NA	340,000 N	43,000	No	BSL
	Anthracene	51 J	110 J	ug/kg	DSY-S-MW08-SS01	3/7	340 - 1700	110	NA	1,700,000 N	35,000	No	BSL
	Benzo(a)anthracene	60 J	470 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	470	NA	150 C	900	Yes	ASL
	Benzo(a)pyrene	50 J	410 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	410	NA NA	15 C	400	Yes	ASL
	Benzo(b)fluoranthene	36 J	660 J	ug/kg	DSY-S-MW09-0001	7/8	710 - 710	660	NA	150 C	900	Yes	ASL
	Benzo(g,h,i)perylene	48 J	190 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA	170,000 N <sup>(8)</sup>	800	No	BSL
	Benzo(k)fluoranthene	76 J	270 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	270	NA	1,500 C	900	No	BSL
	Bis(2-ethylhexyl)phthalate	3,000	8,700	ug/kg	DSY-S-TP07-0001	2/8	350 - 2700	8,700	NA NA	35,000 C	46,000	No	BSL
	Carbazole	37 J	56 J	ug/kg	DSY-S-TP10-0001	2/7	340 - 1700	56	NA	NA 45 000 C	NA 100	No	NTX
	Chrysene	41 J 62 J	580 J 62 J	ug/kg	DSY-S-MW09-0001 DSY-S-MW09-0001	7/8 1/7	350 - 710 340 - 1700	580 62	NA NA	15,000 C <b>15 C</b>	<b>400</b> 400	Yes	ASL ASL
	Dibenzo(a,h)anthracene di-n-Butyl Phthalate	51 J	62 J 64 J	ug/kg ug/kg	DSY-S-MW09-0001	2/7	340 - 1700	64	NA NA	610,000 N	NA	<b>Yes</b> No	BSL
	di-n-Octyl Phthalate	62 J	62 J	ug/kg ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	62	NA NA	NA	NA NA	No	NTX
206-44-0	Fluoranthene	50 J	770 J	ug/kg ug/kg	DSY-S-MW09-0001	6/8	710 - 1700	770	NA NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	50 J	770 J	ug/kg ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	50	NA NA	230,000 N	28,000	No	BSL
	Indeno(1,2,3-cd)pyrene	48 J	190 J	ug/kg ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA NA	250,000 N	900	Yes	ASL
	Phenanthrene	36 J	420 J	ug/kg ug/kg	DSY-S-MW08-SS01	6/8	710 - 1700	420	NA NA	170,000 N <sup>(8)</sup>	40,000	No	BSL
	Pyrene	72 J	750 J	ug/kg ug/kg	DSY-S-MW09-0001	7/8	710 - 710	750	NA NA	170,000 N	13,000	No	BSL
Pesticides/P	•	123	730 3	ug/kg	DOT-0-1010003-0001	170	710-710	730	INA	170,000 1	13,000	NO	DOL
	4,4'-DDE	4.5 J	4.5 J	ug/kg	DSY-S-TP08-0001-D	1/7	3.4 - 3.6	4.5	NA	1,400 C	NA	No	BSL
	4,4'-DDT	5 J	8.9	ug/kg	DSY-S-TP08-0001	3/7	3.4 - 3.6	8.9	NA NA	1,700 C	NA NA	No	BSL
	Aroclor-1254	38 J	38 J	ug/kg	DSY-S-MW08-SS01	1/7	34 - 36	38	NA	110 N <sup>(9)</sup>	NA NA	No	BSL
11096-82-5		24 J	24 J	ug/kg ug/kg	DSY-S-TP10-0001	1/7	34 - 36	24	NA NA	220 C	NA NA	No	BSL
	gamma-Chlordane	3.9	3.9	ug/kg	DSY-S-TP10-0001	1/7	1.7 - 1.9	3.9	NA	16,000 C <sup>(10)</sup>	NA NA	No	BSL
	Heptachlor	4.5	4.5	ug/kg ug/kg	DSY-S-TP10-0001	1/7	1.7 - 1.9	4.5	NA NA	110 C	NA NA	No	BSL
Metals	Портавлява	1.0	1.0	ug/Ng	201 0 11 10 0001	17.7	1.7 1.0	1.0	107	1100	10/1	110	
	Aluminum	3,810	11,300	mg/kg	DSY-S-TP09-0001	7/7	_	11,300	16,020	7,700 N	NA	No	BKG
7440-38-2		2.6	23.6	mg/kg	DSY-S-TP09-0001	8/8	-	23.6	13	0.39 C	7	Yes	ASL
7440-39-3		8.9	180	mg/kg	MW09TP01	8/8	-	180	51	1,500 N	5,500	No	BSL
7440-41-7		0.18 J	3.5	mg/kg	DSY-S-MW08-SS01	6/7	0.2 - 0.2	3.5	0.58	16 N	1.5	Yes	ASL
7440-43-9	Cadmium	13	13	mg/kg	MW09TP01	1/8	0.47 - 0.61	13	0.17	7 N	39	Yes	ASL
7440-70-2	Calcium	521	2,790	mg/kg	DSY-S-MW08-SS01	7/7	-	2,790	1,598	NA	NA	No	NUT
7440-47-3	Chromium	6.4 J	130	mg/kg	MW09TP01	8/8	-	130	16	0.29 C <sup>(11)</sup>	390 <sup>(11)</sup>	Yes	ASL
7440-48-4	Cobalt	3.3	23.9	mg/kg	DSY-S-MW08-SS01	7/7	-	23.9	9	2.3 N	NA	Yes	ASL
7440-50-8	Copper	12.9	262	mg/kg	DSY-S-MW08-SS01	7/7	-	262	12.4	310 N	3,100	No	BSL
7439-89-6		7,770	37,200	mg/kg	DSY-S-TP09-0001	7/7	-	37,200	24,200	5,500 N	NA	Yes	ASL
7439-92-1	Lead	9.7 J	189 J	mg/kg	DSY-S-MW08-SS01	8/8	-	189	40	400	150	Yes	ASL
7439-95-4		1,170	3,380	mg/kg	DSY-S-TP09-0001	7/7	-	3,380	2,571	NA	NA	No	NUT
7439-96-5	Manganese	157	597	mg/kg	DSY-S-TP09-0001	7/7	-	597	349	180 N	390	Yes	ASL
7439-97-6		0.07	0.07	mg/kg	DSY-S-MW08-SS01	1/7	0.05 - 0.09	0.07	0.18	2.3 N <sup>(12)</sup>	23	No	BSL, BKG
7440-02-0	Nickel	7.8 J	113	mg/kg	DSY-S-MW08-SS01	7/7	-	113	15	150 N	1,000	No	BSL

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Metals (Con	tinued)											-	
7440-09-7	Potassium	227	397	mg/kg	DSY-S-TP26-0001	7/7	-	397	651	NA	NA	No	NUT, BKG
7782-49-2	Selenium	3	3	mg/kg	MW09TP01	1/8	0.63 - 0.81	3	0.57	39 N	390	No	BSL
7440-23-5	Sodium	19 J	163 J	mg/kg	DSY-S-MW08-SS01	5/7	20.5 - 45.1	163	231	NA	NA	No	NUT, BKG
7440-62-2	Vanadium	6.8 J	23.2 J	mg/kg	DSY-S-TP10-0001	7/7	-	23.2	34	39 N	550	No	BSL, BKG
7440-66-6	Zinc	44.3 J	831 J	mg/kg	DSY-S-MW08-SS01	7/7	-	831	62	2,300 N	6,000	No	BSL
Miscellaneo	us Parameters					•				•	•		
1461-25-2	Tetrabutyltin	11.4 J	11.4 J	ug/kg	DSY-S-TP09-0001	1/7	49 - 50	11.4	NA	1,800 N <sup>(13)</sup>	NA	No	BSL
56573-85-4	Tributyltin	2.1 J	6.9 J	ug/kg	DSY-S-MW08-SS01	2/7	49 - 50	6.9	NA	1,800 N	NA	No	BSL

#### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for pyrene.
- 9 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 10 Value is for chlordane.
- 11 Value is for hexavalent chromium.
- 12 Value is for mercuric chloride (and other mercury salts).
- 13 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

## **Associated Samples**

DSY-S-MW08-SS01

DSY-S-MW09-0001

MW09TP01

DSY-S-TP07-0001

DSY-S-TP08-0001

DSY-S-TP08-0001-D

DSY-S-TP09-0001

DSY-S-TP10-0001

DSY-S-TP26-0001

### **Definitions:**

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

## **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

## TABLE 5-18 COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - FORMER BUILDING 234

## FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
Volatile Org	anic Compounds		<u>l</u>		ı				<u> </u>	I I		<u>.</u>
	Toluene	1 J	2 J	ug/kg	DSY-S-TP08-0001	2/7	10 - 11	2	NA	590	32,000	No
1330-20-7	Total Xylenes	3 J	3 J	ug/kg	DSY-S-MW08-SS01	1/7	10 - 11	3	NA	190	540,000	No
Semivolatile	Organic Compounds											
	Acenaphthene	46 J	52 J	ug/kg	DSY-S-MW08-SS01	2/7	340 - 1700	52	NA	4,100	NA	No
	Anthracene	51 J	110 J	ug/kg	DSY-S-MW08-SS01	3/7	340 - 1700	110	NA	42,000	NA	No
	Benzo(a)anthracene	60 J	470 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	470	NA	10	NA	Yes
	Benzo(a)pyrene	50 J	410 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	410	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	36 J	660 J	ug/kg	DSY-S-MW09-0001	7/8	710 - 710	660	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	48 J	190 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA	9,500 <sup>(7)</sup>	NA	No
207-08-9	Benzo(k)fluoranthene	76 J	270 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	270	NA	350	NA	No
	Bis(2-ethylhexyl)phthalate	3,000	8,700	ug/kg	DSY-S-TP07-0001	2/8	350 - 2700	8700	NA	17	120,000	Yes
	Carbazole	37 J	56 J	ug/kg	DSY-S-TP10-0001	2/7	340 - 1700	56	NA	NA	NA	No
	Chrysene	41 J	580 J	ug/kg	DSY-S-MW09-0001	7/8	350 - 710	580	NA	1,100	NA	No
	Dibenzo(a,h)anthracene	62 J	62 J	ug/kg	DSY-S-MW09-0001	1/7	340 - 1700	62	NA	11	NA	Yes
	di-n-Butyl Phthalate	51 J	64 J	ug/kg	DSY-S-MW09-0001	2/7	340 - 1700	64	NA	1,700	NA	No
117-84-0	di-n-Octyl Phthalate	62 J	62 J	ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	62	NA	NA	NA	No
206-44-0	Fluoranthene	50 J	770 J	ug/kg	DSY-S-MW09-0001	6/8	710 - 1700	770	NA	70,000	NA	No
86-73-7	Fluorene	50 J	50 J	ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	50	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	48 J	190 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA	120	NA	Yes
85-01-8	Phenanthrene	36 J	420 J	ug/kg	DSY-S-MW08-SS01	6/8	710 - 1700	420	NA	9,500 (7)	NA	No
	Pyrene	72 J	750 J	ug/kg	DSY-S-MW09-0001	7/8	710 - 710	750	NA	9,500	NA	No
Pesticides/F												
	4,4'-DDE	4.5 J	4.5 J	ug/kg	DSY-S-TP08-0001-D	1/7	3.4 - 3.6	4.5	NA	46	NA	No
	4,4'-DDT	5 J	8.9	ug/kg	DSY-S-TP08-0001	3/7	3.4 - 3.6	8.9	NA	67	NA	No
	Aroclor-1254	38 J	38 J	ug/kg	DSY-S-MW08-SS01	1/7	34 - 36	38	NA	8.8	NA	Yes
-	Aroclor-1260	24 J	24 J	ug/kg	DSY-S-TP10-0001	1/7	34 - 36	24	NA	24	NA	No
	gamma-Chlordane	3.9	3.9	ug/kg	DSY-S-TP10-0001	1/7	1.7 - 1.9	3.9	NA	1.8 <sup>(8)</sup>	NA	Yes
	Heptachlor	4.5	4.5	ug/kg	DSY-S-TP10-0001	1/7	1.7 - 1.9	4.5	NA	0.14	NA	Yes
Metals		_										
7429-90-5		3,810	11,300	mg/kg	DSY-S-TP09-0001	7/7	-	11300	16,020	23,000	NA	No
7440-38-2		2.6	23.6	mg/kg	DSY-S-TP09-0001	8/8	-	23.6	13	0.0013	NA	Yes
7440-39-3		8.9	180	mg/kg	MW09TP01	8/8	-	180	51	120	NA	Yes
7440-41-7		0.18 J	3.5	mg/kg	DSY-S-MW08-SS01	6/7	0.2 - 0.2	3.5	0.58	13	NA	No
7440-43-9		13	13	mg/kg	MW09TP01	1/8	0.47 - 0.61	13	0.17	0.52	NA	Yes
7440-70-2		521	2,790	mg/kg	DSY-S-MW08-SS01	7/7	-	2790	1,598	NA	NA	No
	Chromium	6.4 J	130	mg/kg	MW09TP01	8/8	-	130	16	0.00059 <sup>(9)</sup>	NA	Yes
7440-48-4		3.3	23.9	mg/kg	DSY-S-MW08-SS01	7/7	-	23.9	9	0.21	NA	Yes
7440-50-8		12.9	262	mg/kg	DSY-S-MW08-SS01	7/7	-	262	12.4	22	NA	Yes
7439-89-6		7,770	37,200	mg/kg	DSY-S-TP09-0001	7/7	-	37200	24,200	270	NA	Yes
	Lead	9.7 J	189 J	mg/kg	DSY-S-MW08-SS01	8/8	-	189	40	14 <sup>(10)</sup>	NA	Yes
	Magnesium	1,170	3,380	mg/kg	DSY-S-TP09-0001	7/7	-	3380	2,571	NA	NA	No
	Manganese	157	597	mg/kg	DSY-S-TP09-0001	7/7	-	597	349	21	NA	Yes
7439-97-6	Mercury	0.07	0.07	mg/kg	DSY-S-MW08-SS01	1/7	0.05 - 0.09	0.07	0.18	0.033	NA	No

# COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
Metals (Con	tinued)											
7440-02-0	Nickel	7.8 J	113	mg/kg	DSY-S-MW08-SS01	7/7	-	113	15	20	NA	Yes
7440-09-7	Potassium	227	397	mg/kg	DSY-S-TP26-0001	7/7	-	397	651	NA	NA	No
7782-49-2	Selenium	3	3	mg/kg	MW09TP01	1/8	0.63 - 0.81	3	0.57	0.4	NA	Yes
7440-23-5	Sodium	19 J	163 J	mg/kg	DSY-S-MW08-SS01	5/7	20.5 - 45.1	163	231	NA	NA	No
7440-62-2	Vanadium	6.8 J	23.2 J	mg/kg	DSY-S-TP10-0001	7/7	-	23.2	34	78	NA	No
7440-66-6	Zinc	44.3 J	831 J	mg/kg	DSY-S-MW08-SS01	7/7	-	831	62	290	NA	Yes
Miscellaneo	us Parameters											
	Tetrabutyltin	11.4 J	11.4 J	ug/kg	DSY-S-TP09-0001	1/7	49 - 50	11.4	NA	NA	NA	No
56573-85-4	Tributyltin	2.1 J	6.9 J	ug/kg	DSY-S-MW08-SS01	2/7	49 - 50	6.9	NA	NA	NA	No
TCLP Metals	5											
7440-39-3	Barium	90.7	456	ug/L	DSY-S-TP08-0001-D	5/7	129 - 272	456	NA	NA	23,000	No
7440-43-9	Cadmium	4 J	4 J	ug/L	DSY-S-MW08-SS01	1/7	3 - 3	4	NA	NA	30	No
7440-47-3	Chromium	8.7 J	52.4 J	ug/L	DSY-S-TP08-0001-D	2/7	6 - 6	52.4	NA	NA	1,100	No
7439-92-1	Lead	9.6 J	114	ug/L	DSY-S-TP08-0001-D	6/7	2.5 - 2.5	114	NA	NA	40	Yes
7782-49-2	Selenium	8.1	8.1	ug/L	DSY-S-TP26-0001	1/7	4 - 5.9	8.1	NA	NA	600	No

## Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
- 6 Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 7 Value is for pyrene.
- 8 Value is for chlordane.
- 9 Value is for hexavalent chromium.
- 10 Value is MCL based soil screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

## **Associated Samples**

 DSY-S-MW08-SS01
 DSY-S-TP08-0001-D

 DSY-S-MW09-0001
 DSY-S-TP09-0001

 MW09TP01
 DSY-S-TP10-0001

 DSY-S-TP07-0001
 DSY-S-TP26-0001

DSY-S-TP08-0001

## **Definitions:**

C = Carcinogen

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

# TABLE 5-19 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
	anic Compounds								-	_	-		
	Benzene	1 J	1 J	ug/kg	DSY-SB-06-0204	1/10	10 - 110	1	NA	1,100 C	2,500	No	BSL
	Ethylbenzene	66 J	66 J	ug/kg	DSY-S-TP26-0305	1/10	10 - 12	66	NA	5,400 C	71,000	No	BSL
108-88-3	Toluene	1 J	1 J	ug/kg	DSY-SB-06-0204	1/10	10 - 110	1	NA	500,000 N	190,000	No	BSL
540-59-0	Total 1,2-Dichloroethene	1 J	3 J	ug/kg	DSY-S-MW08-0810	2/10	10 - 110	3	NA	70,000 N	630,000	No	BSL
1330-20-7	Total Xylenes	150	150	ug/kg	DSY-S-TP26-0305	1/10	10 - 12	150	NA	63,000 N	110,000	No	BSL
79-01-6	Trichloroethene	3 J	3 J	ug/kg	DSY-S-MW08-0810	1/10	10 - 110	3	NA	440 N <sup>(8)</sup>	13,000	No	BSL
	Organic Compounds				1	_	1		T		T		
	2-Methylnaphthalene	14,000	14,000	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	14,000	NA	23,000 N	123,000	No	BSL
120-12-7	Anthracene	900 J	900 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	900	NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	48 J	70 J	ug/kg	DSY-S-MW09-1012-D	2/10	340 - 3900	70	NA	150 C	900	No	BSL
50-32-8	Benzo(a)pyrene	41 J	55 J	ug/kg	DSY-S-TP08-0406	2/10	340 - 3900	55	NA	15 C	400	Yes	ASL
205-99-2	Benzo(b)fluoranthene	63 J	80 J	ug/kg	DSY-S-TP08-0406	2/10	340 - 3900	80	NA	150 C	900	No	BSL
191-24-2	Benzo(g,h,i)perylene	45 J	45 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	45	NA	170,000 N <sup>(9)</sup>	800	No	BSL
207-08-9	Benzo(k)fluoranthene	68 J	68 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	68	NA	1,500 C	900	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	22,000	22,000	ug/kg	DSY-S-TP08-0910	1/10	340 - 3900	22,000	NA	35,000 C	46,000	No	BSL
218-01-9	Chrysene	41 J	54 J	ug/kg	DSY-S-MW09-1012, DSY-S-TP08-0406	2/10	340 - 3900	54	NA	15,000 C	400	No	BSL
84-74-2	di-n-Butyl Phthalate	50 J	50 J	ug/kg	DSY-SB-04-0406	1/10	340 - 3900	50	NA	610,000 N	NA	No	BSL
206-44-0	Fluoranthene	100 J	130 J	ug/kg	DSY-S-MW09-1012, DSY-S-MW09-1012-D	3/10	360 - 3900	130	NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	2,100 J	2,100 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	2,100	NA	230,000 N	28,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	41 J	41 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	41	NA	150 C	900	No	BSL
91-20-3	Naphthalene	2,200 J	2,200 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	2,200	NA	3,600 C	54,000	No	BSL
85-01-8	Phenanthrene	51 J	4,800	ug/kg	DSY-S-TP26-0305	4/10	360 - 3600	4,800	NA	170,000 N <sup>(9)</sup>	40,000	No	BSL
129-00-0	Pyrene	87 J	460 J	ug/kg	DSY-S-TP26-0305	4/10	360 - 3600	460	NA	170,000 N	13,000	No	BSL
Pesticides/F	1 7	<u> </u>	•	0 0			1.				,	1	
76-44-8	Heptachlor	4	4	ug/kg	DSY-S-TP26-0305	1/10	1.7 - 2.5	4	NA	110 C	NA	No	BSL
Metals	· · ·	•					•						
7429-90-5	Aluminum	1,690	23,300	mg/kg	DSY-S-TP09-0910	16/16	-	23,300	13,075	7,700 N	NA	Yes	ASL
7440-38-2		1.2 J	42	mg/kg	DSY-S-TP26-0406	15/16	3.5 - 3.5	42	20	0.39 C	7	Yes	ASL
7440-39-3	Barium	3.1 J	33.6	mg/kg	DSY-S-TP26-0910	16/16	-	33.6	36	1,500 N	5,500	No	BSL, BKG
7440-41-7		0.2 J	0.67	mg/kg	DSY-S-TP08-0406	11/16	0.17 - 0.23	0.67	0.64	16 N	1.5	No	BSL
7440-43-9	Cadmium	0.66 J	0.66 J	mg/kg	DSY-S-TP10-1213	1/16	0.51 - 0.69	0.66	0.23	7 N	39	No	BSL
7440-70-2	Calcium	322 J	5,190	mg/kg	DSY-S-MW09-3638	16/16	-	5,190	1,689	NA	NA	No	NUT
7440-47-3	Chromium	2.2 J	60.2	mg/kg	DSY-SB-06-0204	16/16	-	60.2	18	0.29 C <sup>(10)</sup>	390 <sup>(10)</sup>	Yes	ASL
7440-48-4	Cobalt	1.1 J	25	mg/kg	DSY-S-TP09-0910	15/16	3.9 - 3.9	25	17	2.3 N	NA	Yes	ASL
7440-50-8	Copper	4.1	46.1	mg/kg	DSY-S-TP08-0406	16/16	-	46.1	24	310 N	3,100	No	BSL
7439-89-6		4,060	50,000	mg/kg	DSY-S-TP09-0910	16/16	-	50,000	39,173	5,500 N	NA	Yes	ASL
7439-92-1	Lead	1.5 J	75 J	mg/kg	DSY-S-TP26-0406	15/16	1.3 - 1.3	75	12	400	150	No	BSL
7439-95-4	Magnesium	534	8,600	mg/kg	DSY-S-TP09-0910	16/16		8,600	3,811	NA	NA	No	NUT
7439-96-5	Manganese	78.6 J	2,450	mg/kg	DSY-S-TP09-0910	16/16	-	2,450	1,037	180 N	390	Yes	ASL
7439-97-6	Mercury	0.06	0.06	mg/kg	DSY-S-TP26-0406	1/16	0.05 - 0.06	0.06	0.012	2.3 N <sup>(11)</sup>	23	No	BSL
7440-02-0	Nickel	2.3 J	48.1	mg/kg	DSY-S-TP09-0910	15/16	7.2 - 7.2	48.1	28	150 N	1,000	No	BSL

# OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Metals (Con	tinued)												
7440-09-7	Potassium	108	593	mg/kg	DSY-S-MW09-2022	16/16	-	593	1,699	NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.81 J	1.4 J	mg/kg	DSY-S-TP09-0406	2/16	0.68 - 0.92	1.4	0.286	39 N	390	No	BSL
7440-22-4	Silver	1.6 J	1.6 J	mg/kg	DSY-S-TP09-0910	1/16	1 - 1.4	1.6	0.12	39 N	200	No	BSL
7440-23-5	Sodium	14.5 J	353	mg/kg	DSY-S-TP08-0910	9/15	17 - 68.8	353	83	NA	NA	No	NUT
7440-62-2	Vanadium	4.4 J	19.6 J	mg/kg	DSY-S-TP09-0406	16/16	-	19.6	23	39 N	550	No	BSL, BKG
7440-66-6	Zinc	10 J	158	mg/kg	DSY-S-TP08-0406	16/16	-	158	66	2,300 N	6,000	No	BSL
Miscellaneo	us Parameters												
1461-25-2	Tetrabutyltin	2.9 J	2.9 J	ug/kg	DSY-S-TP08-0910	1/10	49 - 50	2.9	NA	1,800 N <sup>(12)</sup>	NA	No	BSL

#### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 Value is for pyrene.
- 10 Value is for hexavalent chromium.
- 11 Value is for mercuric chloride (and other mercury salts).
- 12 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

## **Associated Samples**

DSY-S-MW08-0810	DSY-S-TP08-0910
DSY-S-MW09-1012	DSY-S-TP09-0406
DSY-S-MW09-1012-D	DSY-S-TP09-0910
DSY-S-MW09-2022	DSY-S-TP10-0507
DSY-S-MW09-3032	DSY-S-TP10-1213
DSY-S-MW09-3638	DSY-S-TP26-0305
DSY-SB-04-0406	DSY-S-TP26-0406
DSY-SB-06-0204	DSY-S-TP26-0910
DSY-S-TP08-0406	

## **Definitions:**

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

## **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

# TABLE 5-20 COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

**USEPA RSL RIDEM GA** Frequency Concentration **Exceeds** CAS Minimum Maximum Range of Background Sample of Maximum Chemical Units Used for Migration from Soil Leachability Screening Concentration<sup>(4)</sup> Nondetects<sup>(2)</sup> Number Concentration<sup>(1)</sup> Concentration Concentration<sup>(1)</sup> Screening<sup>(3)</sup> to Groundwater<sup>(5)</sup> **Detection** Criteria<sup>(6)</sup> Criteria? Volatile Organic Compounds 71-43-2 Benzene 1 J 1 J ug/kg DSY-SB-06-0204 1/10 10 - 110 NA 0.2 200 Yes 66 J DSY-S-TP26-0305 1/10 10 - 12 66 NA 1.5 27,000 100-41-4 Ethylbenzene 66 J ug/kg Yes DSY-SB-06-0204 1/10 10 - 110 NA 108-88-3 Toluene 1 J 1 J ug/kg 590 32 No DSY-S-MW08-0810 2/10 NA 37 540-59-0 Total 1,2-Dichloroethene 1 J 3 J 10 - 110 3 NA No ug/kg DSY-S-TP26-0305 1330-20-7 Total Xylenes 150 150 ug/kg 1/10 10 - 12 150 NA 190 540 No DSY-S-MW08-0810 Trichloroethene 79-01-6 3 J 3 J ug/kg 1/10 10 - 110 3 NA 0.16 200 Yes Semivolatile Organic Compounds 91-57-6 2-Methylnaphthalene 14,000 14.000 DSY-S-TP26-0305 1/10 340 - 3600 14,000 NA 140 NA ug/kg Yes 900 J DSY-S-TP26-0305 1/10 340 - 3600 42.000 120-12-7 Anthracene 900 J ug/kg 900 NA NA No 2/10 NΑ 56-55-3 Benzo(a)anthracene 48 J 70 J DSY-S-MW09-1012-D 340 - 3900 70 NA ug/kg Yes 10 DSY-S-TP08-0406 3.5 50-32-8 Benzo(a)pyrene 41 J 55 J ug/kg 2/10 340 - 3900 55 NA 240 Yes Benzo(b)fluoranthene 80 35 205-99-2 63 J 80 J DSY-S-TP08-0406 2/10 340 - 3900 NA NA Yes ug/kg 45 J 45 J DSY-S-TP08-0406 1/10 340 - 3900 45 NA 9,500 (7 NA 191-24-2 Benzo(g,h,i)perylene ug/kg No 207-08-9 DSY-S-TP08-0406 1/10 340 - 3900 68 NA 350 No Benzo(k)fluoranthene 68 J 68 J ug/kg NA DSY-S-TP08-0910 1/10 340 - 3900 22.000 NA 120.000 117-81-7 Bis(2-ethylhexyl)phthalate 22.000 22.000 ug/kg 17 Yes DSY-S-MW09-1012. DSY-S-TP08-0406 218-01-9 41 J 54 J 2/10 340 - 3900 54 NA 1.100 NA No Chrysene ug/kg DSY-SB-04-0406 50 84-74-2 di-n-Butyl Phthalate 50 J 50 J 1/10 340 - 3900 NA 1,700 NA No ug/kg DSY-S-MW09-1012, 206-44-0 Fluoranthene 100 J 130 J ug/kg DSY-S-MW09-1012-D 3/10 360 - 3900 130 NA 70.000 NA No 2,100 J 2,100 J DSY-S-TP26-0305 1/10 340 - 3600 2,100 NA 4,000 NA No 86-73-7 Fluorene ug/kg DSY-S-TP08-0406 193-39-5 Indeno(1,2,3-cd)pyrene 41 J 1/10 340 - 3900 41 NA 120 NA 41 J ug/kg No DSY-S-TP26-0305 2,200 91-20-3 Naphthalene 2,200 J 2,200 J ug/kg 1/10 340 - 3600 NA 0.47 800 Yes Phenanthrene DSY-S-TP26-0305 4/10 NA 9,500 85-01-8 51 J 4,800 ug/kg 360 - 3600 4,800 NA No DSY-S-TP26-0305 129-00-0 Pyrene 87 J 460 J ug/kg 4/10 360 - 3600 460 NA 9.500 NA No Pesticides/PCBs 76-44-8 Heptachlor DSY-S-TP26-0305 0.14 4 4 ug/kg 1/10 1.7 - 2.5 4 NA NA Yes Metals 7429-90-5 Aluminum 1,690 23,300 DSY-S-TP09-0910 16/16 23,300 13,075 23,000 NA mg/kg Yes 7440-38-2 Arsenic 1.2 J 42 mg/kg DSY-S-TP26-0406 15/16 3.5 - 3.5 42 20 0.0013 NA Yes 33.6 33.6 7440-39-3 Barium 3.1 J mg/kg DSY-S-TP26-0910 16/16 36 120 NA No 7440-41-7 Beryllium 11/16 0.64 NA 0.2 J 0.67 mg/kg DSY-S-TP08-0406 0.17 - 0.230.67 13 No 7440-43-9 **Cadmium** 0.66 J 0.66 . DSY-S-TP10-1213 1/16 0.51 - 0.69 0.66 0.23 0.52 NA mg/kg Yes 7440-70-2 Calcium 322 J 5.190 DSY-S-MW09-3638 16/16 5.190 1.689 NA NA mg/kg Nο 7440-47-3 Chromium 2.2 J 60.2 DSY-SB-06-0204 16/16 60.2 18 0.00059 (8) NA mg/kg Yes DSY-S-TP09-0910 7440-48-4 Cobalt 1.1 J 25 15/16 3.9 - 3.925 17 0.21 NA Yes mg/kg 7440-50-8 **Copper** 46.1 DSY-S-TP08-0406 16/16 46.1 NA 4.1 mg/kg 24 22 Yes 7439-89-6 Iron 4.060 50.000 DSY-S-TP09-0910 16/16 50,000 39,173 270 NA mg/kg Yes 7439-92-1 DSY-S-TP26-0406 14 <sup>(9)</sup> Lead 1.5 J 75 J 15/16 75 12 NA mg/kg 1.3 - 1.3 Yes 7439-95-4 Magnesium 534 8,600 mg/kg DSY-S-TP09-0910 16/16 8,600 3,811 NA NA No DSY-S-TP09-0910 7439-96-5 **Manganese** 78.6 J 2,450 mg/kg 16/16 2,450 1,037 21 NA Yes DSY-S-TP26-0406 NA 7439-97-6 **Mercury** 0.06 0.06 1/16 0.05 - 0.06 0.06 0.012 0.033 mg/kg Yes

# COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
Metals (Cont	tinued)											
7440-02-0	Nickel	2.3 J	48.1	mg/kg	DSY-S-TP09-0910	15/16	7.2 - 7.2	48.1	28	20	NA	Yes
7440-09-7	Potassium	108	593	mg/kg	DSY-S-MW09-2022	16/16	-	593	1,699	NA	NA	No
7782-49-2	Selenium	0.81 J	1.4 J	mg/kg	DSY-S-TP09-0406	2/16	0.68 - 0.92	1.4	0.286	0.4	NA	Yes
7440-22-4	Silver	1.6 J	1.6 J	mg/kg	DSY-S-TP09-0910	1/16	1 - 1.4	1.6	0.12	0.6	NA	Yes
7440-23-5	Sodium	14.5 J	353	mg/kg	DSY-S-TP08-0910	9/15	17 - 68.8	353	83	NA	NA	No
7440-62-2	Vanadium	4.4 J	19.6 J	mg/kg	DSY-S-TP09-0406	16/16	-	19.6	23	78	NA	No
7440-66-6	Zinc	10 J	158	mg/kg	DSY-S-TP08-0406	16/16	-	158	66	290	NA	No
Miscellaneo	us Parameters											
1461-25-2	Tetrabutyltin	2.9 J	2.9 J	ug/kg	DSY-S-TP08-0910	1/10	49 - 50	2.9	NA	NA	NA	No
TCLP Metals	3						•					
7440-39-3	Barium	69.9	133	ug/L	DSY-S-TP26-0305	3/10	61.5 - 123	133	NA	NA	23,000	No
7440-47-3	Chromium	129	129	ug/L	DSY-SB-06-0204	1/10	6 - 7.4	129	NA	NA	1,100	No
7439-92-1	Lead	15.8 J	21.8 J	ug/L	DSY-S-MW09-1012-D	1/10	1 - 5.4	21.8	NA	NA	40	No

## Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
- 6 Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 7 Value is for pyrene.
- 8 Value is for hexavalent chromium.
- 9 Value is MCL based soil screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

## **Associated Samples**

DSY-S-MW08-0810	DSY-S-TP08-0910
DSY-S-MW09-1012	DSY-S-TP09-0406
DSY-S-MW09-1012-D	DSY-S-TP09-0910
DSY-S-MW09-2022	DSY-S-TP10-0507
DSY-S-MW09-3032	DSY-S-TP10-1213
DSY-S-MW09-3638	DSY-S-TP26-0305
DSY-SB-04-0406	DSY-S-TP26-0406
DSY-SB-06-0204	DSY-S-TP26-0910
DSY-S-TP08-0406	

## **Definitions:**

C = Carcinogen

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

# OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

## PAGE 1 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Volatile Org	anic Compounds													
75-35-4	1,1-Dichloroethene	0.25 J	0.25 J	ug/L	DSY-GW-MW08-030111	1/4	10 - 10	0.25	NA	26 N	7 7	EPA-MCL RIDEM	No	BSL
156-59-2	cis-1,2-Dichloroethene	12.7	12.7	ug/L	DSY-GW-MW08-030111	1/1	-	12.7	NA	2.8 N	70 70	EPA-MCL RIDEM	Yes	ASL
79-01-6	Trichloroethene	3 J	4 J	ug/L	DSY-A-MW08-01	3/4	10 - 10	4	NA	0.26 N <sup>(7)</sup>	5 5	EPA-MCL RIDEM	Yes	ASL
75-69-4	Trichlorofluoromethane	0.581 J	0.581 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.581	NA	110 N	NA NA	NA NA	No	BSL
75-01-4	Vinyl Chloride	0.263 J	100	ug/L	DSY-A-MW104-01	2/4	10 - 10	100	NA	0.015 C	2 2	EPA-MCL RIDEM	Yes	ASL
Metals (Tota	al)	· L	l l				1	I.	l .					
	Áluminum	53.7	1,010	ug/L	DSY-A-MW09-01	2/4	33.7 - 102	1,010	NA	1,600 N	<b>50 - 200</b> NA	EPA-SDWR NA	Yes	ASL
7440-38-2	Arsenic	1.32 J	19.8	ug/L	DSY-A-MW104-01	3/4	4 - 4	19.8	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
7440-39-3	Barium	17	99.3	ug/L	DSY-A-MW09-01	3/4	11.5 - 33.9	99.3	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
7440-43-9	Cadmium	0.286 J	0.286 J	ug/L	DSY-GW-MW08-030111	1/4	3 - 3	0.286	NA	0.69 N	5 5	EPA-MCL RIDEM	No	BSL
7440-70-2	Calcium	28,400	46,900	ug/L	DSY-A-MW104-01	4/4	-	46,900	NA	NA	NA NA	NA NA	No	NUT
7440-47-3	Chromium	7.2 J	57.6 J	ug/L	DSY-A-MW09-01	3/4	1 - 1	57.6	NA	0.031 C	100 100	EPA-MCL RIDEM	Yes	ASL
7440-48-4	Cobalt	1.74 J	1.74 J	ug/L	DSY-GW-MW08-030111	1/4	3.4 - 18.5	1.74	NA	0.47 N	NA NA	NA NA	Yes	ASL
7440-50-8	Copper	1.57 J	12.7	ug/L	DSY-A-MW104-01	3/4	5 - 5	12.7	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
7439-89-6	Iron	459	5,660	ug/L	DSY-A-MW08-01	4/4	140 - 140	5,660	NA	1,100 N	<b>300</b> NA	EPA-SDWR NA	Yes	ASL
7439-92-1	Lead	14.6	14.6	ug/L	DSY-A-MW104-01	1/4	0.75 - 1	14.6	NA	NA	15 15	EPA-MCL RIDEM	No	BSL
7439-95-4	Magnesium	6,530	13,400	ug/L	DSY-A-MW08-01-D	4/4	-	13,400	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	20.5	4,300	ug/L	DSY-A-MW104-01	4/4	-	4,300	NA	32 N	<b>50</b> NA	EPA-SDWR NA	Yes	ASL
7440-02-0	Nickel	2.08 J	2.08 J	ug/L	DSY-GW-MW08-030111	1/4	9 - 34.6	2.08	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	1,440	7,650	ug/L	DSY-A-MW09-01	4/4	-	7,650	NA	NA	NA NA	NA NA	No	NUT
7440-23-5	Sodium	32,000	119,000	ug/L	DSY-A-MW104-01	4/4	-	119,000	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	29.8 J	29.8 J	ug/L	DSY-GW-MW08-030111	1/4	14.2 - 52.1	29.8	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

## PAGE 2 OF 3

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Metals (Dis														
7429-90-5	Aluminum	36.6 J	36.6 J	ug/L	DSY-GW-MW08-030111	1/1	-	36.6	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	No	BSL
7440-38-2	Arsenic	1.37 J	1.37 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.37	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
7440-39-3	Barium	16.1	16.1	ug/L	DSY-GW-MW08-030111	1/1	-	16.1	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
7440-43-9	Cadmium	0.274 J	0.274 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.274	NA	0.69 N	5 5	EPA-MCL RIDEM	No	BSL
7440-70-2	Calcium	47,800	47,800	ug/L	DSY-GW-MW08-030111	1/1	-	47,800	NA	NA	NA NA	NA NA	No	NUT
7440-48-4	Cobalt	1.78 J	1.78 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.78	NA	0.47 N	NA NA	NA NA	Yes	ASL
7440-50-8	Copper	1.17 J	1.17 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.17	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
7439-89-6	Iron	423	423	ug/L	DSY-GW-MW08-030111	1/1	-	423	NA	1,100 N	<b>300</b> NA	EPA-SDWR NA	Yes	ASL
7439-95-4	Magnesium	9,790	9,790	ug/L	DSY-GW-MW08-030111	1/1	-	9,790	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	531	531	ug/L	DSY-GW-MW08-030111	1/1	-	531	NA	32 N	<b>50</b> NA	EPA-SDWR NA	Yes	ASL
7440-02-0	Nickel	1.75 J	1.75 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.75	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	5,010	5,010	ug/L	DSY-GW-MW08-030111	1/1	-	5,010	NA	NA	NA NA	NA NA	No	NUT
7440-23-5	Sodium	114,000	114,000	ug/L	DSY-GW-MW08-030111	1/1	-	114,000	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	16.6	16.6	ug/L	DSY-GW-MW08-030111	1/1	-	16.6	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
Miscellaneo	ous Parameters	1			•	I.	1	1	1		1	1		
	Monobutyltin	0.16 J	0.16 J	ug/L	DSY-A-MW08-01-D	1/3	1 - 1	0.16	NA	NA	NA NA	NA NA	No	NTX

#### Footnotes

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

## **Definitions:**

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

CAS = Chemical Abstracts Service

COPC = Chemical Of Potential Concern

EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)

EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

RIDEM = Rhode Island Department of Environmental Management GA Groundwater Objective (February, 2004).

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>	
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## **Associated Samples**

DSY-A-MW08-01 DSY-A-MW08-01-D DSY-A-MW09-01 DSY-A-MW104-01 DSY-GW-MW08-030111

## Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

## TABLE 5-22 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - FORMER BUILDING 234

## FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

## PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Vapor Intrusion Criteria <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
	anic Compounds	T				T	T		1 1				1 1	
75-35-4	1,1-Dichloroethene	0.25 J	0.25 J	ug/L	DSY-GW-MW08-030111	1/4	10 - 10	0.25	NA	20 N	NA	NA	No	BSL
156-59-2	cis-1,2-Dichloroethene	12.7	12.7	ug/L	DSY-GW-MW08-030111	1/1	-	12.7	NA	NA (7)	NA	NA	No	NTX
79-01-6	Trichloroethene	3 J	4 J	ug/L	DSY-A-MW08-01	3/4	10 - 10	4	NA	0.52 N <sup>(7)</sup>	NA	NA	Yes	ASL
75-69-4	Trichlorofluoromethane	0.581 J	0.581 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.581	NA	18 N	NA	NA	No	BSL
75-01-4	Vinyl Chloride	0.263 J	100	ug/L	DSY-A-MW104-01	2/4	10 - 10	100	NA	0.14 C	NA	NA	Yes	ASL
Metals						_								
7429-90-5	Aluminum	53.7	1,010	ug/L	DSY-A-MW09-01	2/4	33.7 - 102	1,010	NA	NA	NA	NA	No	NTX
7440-38-2	Arsenic	1.32 J	19.8	ug/L	DSY-A-MW104-01	3/4	4 - 4	19.8	NA	NA	NA	NA	No	NTX, BKG
7440-39-3		17	99.3	ug/L	DSY-A-MW09-01	3/4	11.5 - 33.9	99.3	NA	NA	NA	NA	No	NTX
7440-43-9	Cadmium	0.286 J	0.286 J	ug/L	DSY-GW-MW08-030111	1/4	3 - 3	0.286	NA	NA	NA	NA	No	NTX
7440-70-2	Calcium	28,400	46,900	ug/L	DSY-A-MW104-01	4/4	-	46,900	NA	NA	NA	NA	No	NUT
7440-47-3		7.2 J	57.6 J	ug/L	DSY-A-MW09-01	3/4	1 - 1	57.6	NA	NA	NA	NA	No	NTX
	Cobalt	1.74 J	1.74 J	ug/L	DSY-GW-MW08-030111	1/4	3.4 - 18.5	1.74	NA	NA	NA	NA	No	NTX
7440-50-8	Copper	1.57 J	12.7	ug/L	DSY-A-MW104-01	3/4	5 - 5	12.7	NA	NA	NA	NA	No	NTX
7439-89-6	Iron	459	5,660	ug/L	DSY-A-MW08-01	4/4	140 - 140	5,660	NA	NA	NA	NA	No	NTX
7439-92-1	Lead	14.6	14.6	ug/L	DSY-A-MW104-01	1/4	0.75 - 1	14.6	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	6,530	13,400	ug/L	DSY-A-MW08-01-D	4/4	-	13,400	NA	NA	NA	NA	No	NUT
7439-96-5	Manganese	20.5	4,300	ug/L	DSY-A-MW104-01	4/4	-	4,300	NA	NA	NA	NA	No	NTX
7440-02-0	Nickel	2.08 J	2.08 J	ug/L	DSY-GW-MW08-030111	1/4	9 - 34.6	2.08	NA	NA	NA	NA	No	NTX
7440-09-7	Potassium	1,440	7,650	ug/L	DSY-A-MW09-01	4/4	-	7,650	NA	NA	NA	NA	No	NUT
7440-23-5	Sodium	32,000	119,000	ug/L	DSY-A-MW104-01	4/4	-	119,000	NA	NA	NA	NA	No	NUT
7440-66-6	Zinc	29.8 J	29.8 J	ug/L	DSY-GW-MW08-030111	1/4	14.2 - 52.1	29.8	NA	NA	NA	NA	No	NTX
Dissolved M	letals													
7429-90-5	Aluminum	36.6 J	36.6 J	ug/L	DSY-GW-MW08-030111	1/1	-	36.6	NA	NA	NA	NA	No	NTX
7440-38-2	Arsenic	1.37 J	1.37 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.37	NA	NA	NA	NA	No	NTX, BKG
7440-39-3	Barium	16.1	16.1	ug/L	DSY-GW-MW08-030111	1/1	-	16.1	NA	NA	NA	NA	No	NTX
7440-43-9	Cadmium	0.274 J	0.274 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.274	NA	NA	NA	NA	No	NTX
7440-70-2	Calcium	47,800	47,800	ug/L	DSY-GW-MW08-030111	1/1	-	47,800	NA	NA	NA	NA	No	NUT
7440-48-4	Cobalt	1.78 J	1.78 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.78	NA	NA	NA	NA	No	NTX
7440-50-8	Copper	1.17 J	1.17 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.17	NA	NA	NA	NA	No	NTX
7439-89-6		423	423	ug/L	DSY-GW-MW08-030111	1/1	-	423	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	9,790	9,790	ug/L	DSY-GW-MW08-030111	1/1	-	9,790	NA	NA	NA	NA	No	NUT
	Manganese	531	531	ug/L	DSY-GW-MW08-030111	1/1	-	531	NA	NA	NA	NA	No	NTX
7440-02-0		1.75 J	1.75 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.75	NA	NA	NA	NA	No	NTX
7440-09-7		5,010	5,010	ug/L	DSY-GW-MW08-030111	1/1	-	5,010	NA	NA	NA	NA	No	NUT
7440-23-5		114,000	114,000	ug/L	DSY-GW-MW08-030111	1/1	-	114,000	NA	NA	NA	NA	No	NUT
7440-66-6		16.6	16.6	ug/L	DSY-GW-MW08-030111	1/1	_	16.6	NA	NA	NA	NA	No	NTX
	us Parameters			<del></del>		.,								
	Monobutyltin	0.16 J	0.16 J	ug/L	DSY-A-MW08-01-D	1/3	1 - 1	0.16	NA	NA	NA	NA	No	NTX
L		0.100	0.100	∽.g, –		., 0	· · ·	5.10	, .	1 1/ 1	, .	, .		,

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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## Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs. Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

## **Associated Samples**

DSY-A-MW08-01 DSY-A-MW08-01-D DSY-A-MW09-01 DSY-A-MW104-01 DSY-GW-MW08-030111

## **Definitions:**

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
J = Estimated value
NA = Not Applicable/Not Available

## Rationale Codes:

## For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:
BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

## TABLE 5-23 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - SOUTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Polycyclic A	Aromatic Hydrocarbons												
205-99-2	Benzo(b)fluoranthene	43 J	43 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	43	NA	150 C	900	No	BSL
206-44-0	Fluoranthene	59 J	59 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	59	NA	230,000 N	20,000	No	BSL
129-00-0	Pyrene	67 J	67 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	67	NA	170,000 N	13,000	No	BSL
Metals													
	Aluminum	5,860	17,400	mg/kg	DSY-SB201-SO-0204	6/6	-	17400	13075	7,700 N	NA	Yes	ASL
7440-38-2	Arsenic	7.7 J	26.3	mg/kg	DSY-SB202-SO-0204	6/6	-	26.3	20	0.39 C	7	Yes	ASL
7440-39-3	Barium	13.9	18 J	mg/kg	DSY-S-TP02-1516	5/6	2.9 - 2.9	18	36	1,500 N	5,500	No	BSL, BKG
7440-41-7	Beryllium	0.34 J	0.418 J	mg/kg	DSY-SB201-SO-0204	5/6	0.21 - 0.21	0.418	0.64	16 N	1.5	No	BSL, BKG
7440-43-9	Cadmium	0.56 J	0.56 J	mg/kg	DSY-S-TP06-1213	1/6	0.214 - 0.63	0.56	0.23	7 N	39	No	BSL
7440-70-2	Calcium	812	3,490	mg/kg	DSY-S-TP02-1516	6/6	-	3490	1689	NA	NA	No	NUT
7440-47-3	Chromium	6.6 J	21.2	mg/kg	DSY-SB201-SO-0204	6/6	-	21.2	18	0.29 C <sup>(8)</sup>	390 <sup>(8)</sup>	Yes	ASL
7440-48-4	Cobalt	4.4 J	29.9	mg/kg	DSY-S-TP05-1213	6/6	-	29.9	17	2.3 N	NA	Yes	ASL
7440-50-8	Copper	7 J	29.9 J	mg/kg	DSY-SB201-SO-0204	6/6	-	29.9	24	310 N	3,100	No	BSL
7439-89-6	Iron	16,800	45,500	mg/kg	DSY-SB202-SO-0204	6/6	-	45500	39173	5,500 N	NA	Yes	ASL
7439-92-1	Lead	7.6 J	34.2 J	mg/kg	DSY-S-TP02-1516	6/6	-	34.2	12	400	150	No	BSL
7439-95-4	Magnesium	2,230	5,220	mg/kg	DSY-SB201-SO-0204	6/6	-	5220	3811	NA	NA	No	NUT
7439-96-5	Manganese	104 J	800	mg/kg	DSY-S-TP05-1213	6/6	-	800	1,037	180 N	390	No	BKG
7440-02-0	Nickel	10.7 J	38.6	mg/kg	DSY-SB201-SO-0204	6/6	-	38.6	28	150 N	1,000	No	BSL
7440-09-7	Potassium	121 J	365	mg/kg	DSY-S-TP05-1213	6/6	-	365	1,699	NA	NA	No	NUT, BKG
7440-23-5	Sodium	9 J	23 J	mg/kg	DSY-S-TP05-1213	2/6	36.7 - 342	23	83	NA	NA	No	NUT, BKG
7440-62-2	Vanadium	9	18.6	mg/kg	DSY-SB201-SO-0204	6/6	-	18.6	23	39 N	550	No	BSL, BKG
7440-66-6	Zinc	52.5 J	75.7 J	mg/kg	DSY-SB202-SO-0204	6/6	-	75.7	66	2,300 N	6,000	No	BSL

#### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for hexavalent chromium.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

#### **Associated Samples**

 DSY-SB201-SO-0204
 DSY-S-TP02-1516

 DSY-SB202-SO-0204
 DSY-S-TP05-1213

 DSY-S-TP01-1112
 DSY-S-TP06-1213

#### **Definitions:**

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

#### **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

## TABLE 5-24 COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - SOUTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
Polycyclic A	romatic Hydrocarbons											
205-99-2	Benzo(b)fluoranthene	43 J	43 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	43	NA	35	NA	Yes
206-44-0	Fluoranthene	59 J	59 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	59	NA	70,000	NA	No
129-00-0	Pyrene	67 J	67 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	67	NA	9,500	NA	No
Metals												
7429-90-5	Aluminum	5,860	17,400	mg/kg	DSY-SB201-SO-0204	6/6	-	17,400	13075	23,000	NA	No
7440-38-2	Arsenic	7.7 J	26.3	mg/kg	DSY-SB202-SO-0204	6/6	-	26.3	20	0.0013	NA	Yes
7440-39-3	Barium	13.9	18 J	mg/kg	DSY-S-TP02-1516	5/6	2.9 - 2.9	18	36	120	NA	No
7440-41-7	Beryllium	0.34 J	0.418 J	mg/kg	DSY-SB201-SO-0204	5/6	0.21 - 0.21	0.418	0.64	13	NA	No
7440-43-9	Cadmium	0.56 J	0.56 J	mg/kg	DSY-S-TP06-1213	1/6	0.214 - 0.63	0.56	0.23	0.52	NA	Yes
7440-70-2	Calcium	812	3,490	mg/kg	DSY-S-TP02-1516	6/6	-	3,490	1689	NA	NA	No
7440-47-3	Chromium	6.6 J	21.2	mg/kg	DSY-SB201-SO-0204	6/6	-	21.2	18	0.00059 <sup>(8)</sup>	NA	Yes
7440-48-4	Cobalt	4.4 J	29.9	mg/kg	DSY-S-TP05-1213	6/6	-	29.9	17	0.21	NA	Yes
7440-50-8	Copper	7 J	29.9 J	mg/kg	DSY-SB201-SO-0204	6/6	-	29.9	24	22	NA	Yes
7439-89-6	Iron	16,800	45,500	mg/kg	DSY-SB202-SO-0204	6/6	-	45,500	39173	270	NA	Yes
7439-92-1	Lead	7.6 J	34.2 J	mg/kg	DSY-S-TP02-1516	6/6	-	34.2	12	14 <sup>(9)</sup>	NA	Yes
7439-95-4	Magnesium	2,230	5,220	mg/kg	DSY-SB201-SO-0204	6/6	-	5,220	3811	NA	NA	No
	Manganese	104 J	800	mg/kg	DSY-S-TP05-1213	6/6	-	800	1,037	21	NA	No
	Nickel	10.7 J	38.6	mg/kg	DSY-SB201-SO-0204	6/6	-	38.6	28	20	NA	Yes
7440-09-7	Potassium	121 J	365	mg/kg	DSY-S-TP05-1213	6/6	-	365	1,699	NA	NA	No
7440-23-5	Sodium	9 J	23 J	mg/kg	DSY-S-TP05-1213	2/6	36.7 - 342	23	83	NA	NA	No
7440-62-2	Vanadium	9	18.6	mg/kg	DSY-SB201-SO-0204	6/6	-	18.6	23	78	NA	No
7440-66-6	Zinc	52.5 J	75.7 J	mg/kg	DSY-SB202-SO-0204	6/6	-	75.7	66	290	NA	No

#### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
- 6 Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 7 Value is for hexavalent chromium.
- 8 Value is MCL based soil screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

#### **Associated Samples**

DSY-SB201-SO-0204 DSY-S-TP02-1516 DSY-SB202-SO-0204 DSY-S-TP05-1213 DSY-S-TP01-1112 DSY-S-TP06-1213

#### **Definitions:**

J = Estimated value

NA = Not Applicable/Not Available

### OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
	Aromatic Hydrocarbons	4001	000	,,	DOV 00 00000 0 00 7	0./0	000 000	000		00 000 NI	100.000	- N. T	DOI
	2-Methylnaphthalene	18.8 J	299	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	299	NA NA	23,000 N	123,000	No	BSL
83-32-9	Acenaphthene	10 J	1,000	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	1,000	NA	340,000 N	43,000	No	BSL
208-96-8	Acenaphthylene	695	695	ug/kg	DSY-SO-SB209-0.30.7	1/3	3.94 - 360	695	NA NA	340,000 N <sup>(8)</sup>	23,000	No	BSL
120-12-7	Anthracene	45.1 J	2,290	ug/kg	DSY-SO-SB209-0.30.7	2/3	3.94 - 360	2,290	NA NA	1,700,000 N	35,000	No	BSL
	Benzo(a)anthracene	42 J	5,740	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	5,740	NA NA	150 C	900	Yes	ASL
	Benzo(a)pyrene	46.3 J	4,920	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	4,920	NA NA	15 C	400	Yes	ASL
	Benzo(b)fluoranthene	50 J	7,120	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	7,120	NA NA	150 C	900	Yes	ASL
	Benzo(g,h,i)perylene	28.4 J	2,070	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,070	NA NA	170,000 N <sup>(9)</sup>	800	Yes	ASL
	Benzo(k)fluoranthene	28.8 J	2,480	ug/kg	DSY-SO-SB209-0.30.7 DSY-SO-SB209-0.30.7	3/3	-	2,480	NA NA	1,500 C	900	Yes	ASL
	Chrysene	45 J	5,650 820	ug/kg	DSY-SO-SB209-0.30.7 DSY-SO-SB209-0.30.7	4/4	- 360 - 360	5,650 820	NA NA	15,000 C	400	Yes	ASL ASL
	Dibenzo(a,h)anthracene	10.1 J 82 J	13,400	ug/kg	DSY-SO-SB209-0.30.7 DSY-SO-SB209-0.30.7	2/3	360 - 360	13,400	NA NA	<b>15 C</b> 230,000 N	400	Yes	BSL
206-44-0 86-73-7	Fluoranthene Fluorene	6.3 J	1,220	ug/kg	DSY-SO-SB209-0.30.7	4/4 2/3	- 360 - 360	1,220	NA NA	230,000 N 230,000 N	20,000 28,000	No No	BSL
	Indeno(1,2,3-cd)pyrene	23.5 J	2,070	ug/kg ug/kg	DSY-SO-SB209-0.30.7	3/3	360 - 360	2,070	NA NA	230,000 N 150 C	900	Yes	ASL
91-20-3	Naphthalene	23.5 J	751	ug/kg ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	751	NA NA	3,600 C	54,000	No	BSL
	•		9,530		DSY-SO-SB209-0.30.7		300 - 300			170,000 N <sup>(9)</sup>	40,000	<del> </del>	BSL
85-01-8	Phenanthrene	60 J 58 J	9,530	ug/kg	DSY-SO-SB209-0.30.7 DSY-SO-SB209-0.30.7	4/4	-	9,530	NA NA		· · · · · · · · · · · · · · · · · · ·	No	BSL
129-00-0 Pesticides/F	Pyrene	38 J	10,100	ug/kg	DS1-30-3B209-0.30.7	4/4	-	10,100	INA	170,000 N	13,000	No	BSL
	Aroclor-1260	24.2 J	416 J	ug/kg	DSY-SO-SB209-0.30.7	2/7	17.2 - 36	416	NA	220 C	NA	Yes	ASL
	Total Aroclors	24.2 J	416 J	ug/kg ug/kg	DSY-SO-SB209-0.30.7	2/6	17.2 - 30	416	NA NA	220 C	10,000	Yes	ASL
Metals	Total Alociois	24.2 J	410 3	ug/kg	D31-30-3B209-0.30.7	2/0	17.2 - 10.1	410	INA	220 C	10,000	1 63	AGL
7429-90-5	Aluminum	9,120	12,300	mg/kg	DSY-S-MW06-SS01	3/3	_	12,300	16,020	7,700 N	NA	No	BKG
7440-38-2		10.4	21.8 J	mg/kg	DSY-SO-SB208-000.5	4/4	_	21.8	13	0.39 C	7	Yes	ASL
7440-39-3		14.8 J	35.4 J	mg/kg	DSY-SO-SB208-000.5-D	4/4	_	35.4	51	1,500 N	5,500	No	BSL, BKG
7440-41-7		0.45	0.576	mg/kg	DSY-SO-SB208-000.5-D	3/3	_	0.576	0.58	16 N	1.5	No	BSL, BKG
	Cadmium	0.232 J	1.4	mg/kg	B6-S1	2/4	0.122 - 0.61	1.4	0.17	7 N	39	No	BSL
	Calcium	416 J	1,180	mg/kg	DSY-S-MW06-SS01	3/3	-	1,180	1,598	NA	NA	No	NUT, BKG
7440-47-3	Chromium	10 J	15.8 J	mg/kg	DSY-S-MW06-SS01	4/4	_	15.8	16	0.29 C <sup>(10)</sup>	390 <sup>(10)</sup>	No	BKG
	Cobalt	8.62 J	22.7	mg/kg	DSY-S-MW06-SS01	3/3	_	22.7	9	2.3 N	NA	Yes	ASL
7440-50-8		23.4 J	33.5 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	-	33.5	12.4	310 N	3,100	No	BSL
7439-89-6	_	22,500	32,000	mg/kg	DSY-SO-SB208-000.5	3/3	-	32,000	24,200	5,500 N	NA	Yes	ASL
7439-92-1		16.4 J	26.5 J	mg/kg	DSY-SO-SB209-0.30.7	4/4	-	26.5	40	400	150	No	BSL, BKG
	Magnesium	2,840	4,090	mg/kg	DSY-S-MW06-SS01	3/3	-	4,090	2,571	NA	NA	No	NUT
	Manganese	293	619	mg/kg	DSY-S-MW06-SS01	3/3	-	619	349	180 N	390	Yes	ASL
7439-97-6	Mercury	0.0168 J	0.0247 J	mg/kg	DSY-SO-SB208-000.5	2/3	0.0359 - 0.05	0.0247	0.18	2.3 N <sup>(11)</sup>	23	No	BSL, BKG
7440-02-0	,	21.1	26.3	mg/kg	DSY-SO-SB208-000.5-D	3/3	-	26.3	15	150 N	1,000	No	BSL
7440-09-7		282	394 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	904 - 904	394	651	NA	NA	No	NUT, BKG
7782-49-2		0.301 J	0.631	mg/kg	DSY-SO-SB208-000.5-D	2/3	0.82 - 1.51	0.631	0.57	39 N	390	No	BSL
7440-23-5		71.4 J	71.4 J	mg/kg	DSY-SO-SB209-0.30.7	1/2	182 - 904	71.4	231	NA	NA	No	NUT, BKG
7440-62-2		14.2	25.1	mg/kg	DSY-SO-SB208-000.5	3/3	-	25.1	34	39 N	550	No	BSL, BKG
7440-66-6	Zinc	75.5 J	137 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	-	137	62	2,300 N	6,000	No	BSL

### OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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#### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for acenaphthene.
- 9 Value is for pyrene.
- 10 Value is for hexavalent chromium.
- 11 Value is for mercuric chloride (and other mercury salts).

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

#### **Associated Samples**

DSY-S-MW06-SS01

DSY-SO-SB208-000.5

DSY-SO-SB208-000.5-D

DSY-SO-SB209-0.30.7

DSY-SO-SB215-000.5

DSY-SO-SB216-000.5

DSY-SO-SB217-000.5 DSY-SO-SB224-000.5

DSY-SO-SB224-000.5-D

B6-S1

#### **Definitions:**

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

#### **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

### COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
Polycyclic A	Aromatic Hydrocarbons											
91-57-6	2-Methylnaphthalene	18.8 J	299	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	299	NA	140	NA	Yes
83-32-9	Acenaphthene	10 J	1,000	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	1,000	NA	4,100	NA	No
208-96-8	Acenaphthylene	695	695	ug/kg	DSY-SO-SB209-0.30.7	1/3	3.94 - 360	695	NA	4,100 <sup>(7)</sup>	NA	No
120-12-7	Anthracene	45.1 J	2,290	ug/kg	DSY-SO-SB209-0.30.7	2/3	3.94 - 360	2,290	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	42 J	5,740	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	5,740	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	46.3 J	4,920	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	4,920	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	50 J	7,120	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	7,120	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	28.4 J	2,070	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,070	NA	9,500 (8)	NA	No
207-08-9	Benzo(k)fluoranthene	28.8 J	2,480	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,480	NA	350	NA	Yes
218-01-9	Chrysene	45 J	5,650	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	5,650	NA	1,100	NA	Yes
53-70-3	Dibenzo(a,h)anthracene	10.1 J	820	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	820	NA	11	NA	Yes
206-44-0	Fluoranthene	82 J	13,400	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	13,400	NA	70,000	NA	No
86-73-7	Fluorene	6.3 J	1,220	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	1,220	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	23.5 J	2,070	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,070	NA	120	NA	Yes
91-20-3	Naphthalene	14.7 J	751	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	751	NA	0.47	800	Yes
85-01-8	Phenanthrene	60 J	9,530	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	9,530	NA	9,500 <sup>(8)</sup>	NA	Yes
129-00-0	Pyrene	58 J	10,100	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	10,100	NA	9,500	NA	Yes
Pesticides/F	PCBs						•					
11096-82-5	Aroclor-1260	24.2 J	416 J	ug/kg	DSY-SO-SB209-0.30.7	2/7	17.2 - 36	416	NA	24	NA	Yes
1336-36-3	Total Aroclors	24.2 J	416 J	ug/kg	DSY-SO-SB209-0.30.7	2/6	17.2 - 18.1	416	NA	26	10,000	Yes
Metals												
7429-90-5	Aluminum	9,120	12,300	mg/kg	DSY-S-MW06-SS01	3/3	-	12,300	16,020	23,000	NA	No
7440-38-2		10.4	21.8 J	mg/kg	DSY-SO-SB208-000.5	4/4	-	21.8	13	0.0013	NA	Yes
7440-39-3	Barium	14.8 J	35.4 J	mg/kg	DSY-SO-SB208-000.5-D	4/4	-	35.4	51	120	NA	No
	Beryllium	0.45	0.576	mg/kg	DSY-SO-SB208-000.5-D	3/3	-	0.576	0.58	13	NA	No
7440-43-9		0.232 J	1.4	mg/kg	B6-S1	2/4	0.122 - 0.61	1.4	0.17	0.52	NA	Yes
7440-70-2	Calcium	416 J	1,180	mg/kg	DSY-S-MW06-SS01	3/3	-	1,180	1,598	NA	NA	No
7440-47-3	Chromium	10 J	15.8 J	mg/kg	DSY-S-MW06-SS01	4/4	-	15.8	16	0.00059 <sup>(9)</sup>	NA	No
7440-48-4		8.62 J	22.7	mg/kg	DSY-S-MW06-SS01	3/3	-	22.7	9	0.21	NA	Yes
7440-50-8	Copper	23.4 J	33.5 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	-	33.5	12.4	22	NA	Yes
7439-89-6	Iron	22,500	32,000	mg/kg	DSY-SO-SB208-000.5	3/3	-	32,000	24,200	270	NA	Yes
7439-92-1	Lead	16.4 J	26.5 J	mg/kg	DSY-SO-SB209-0.30.7	4/4	-	26.5	40	14 <sup>(10)</sup>	NA	Yes
7439-95-4	Magnesium	2,840	4,090	mg/kg	DSY-S-MW06-SS01	3/3	-	4,090	2,571	NA	NA	No
7439-96-5	Manganese	293	619	mg/kg	DSY-S-MW06-SS01	3/3	-	619	349	21	NA	Yes
7439-97-6		0.0168 J	0.0247 J	mg/kg	DSY-SO-SB208-000.5	2/3	0.0359 - 0.05	0.0247	0.18	0.033	NA	No
7440-02-0	Nickel	21.1	26.3	mg/kg	DSY-SO-SB208-000.5-D	3/3	-	26.3	15	20	NA	Yes
7440-09-7		282	394 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	904 - 904	394	651	NA	NA	No
7782-49-2		0.301 J	0.631	mg/kg	DSY-SO-SB208-000.5-D	2/3	0.82 - 1.51	0.631	0.57	0.4	NA	Yes
7440-23-5		71.4 J	71.4 J	mg/kg	DSY-SO-SB209-0.30.7	1/2	182 - 904	71.4	231	NA	NA	No
7440-62-2		14.2	25.1	mg/kg	DSY-SO-SB208-000.5	3/3	-	25.1	34	78	NA	No
7440-66-6		75.5 J	137 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	-	137	62	290	NA	No
TCLP Metal:		_	,			_	_			<del>.</del>		
7440-47-3	Chromium	13.6	13.6	ug/L	DSY-S-MW06-SS01	1/1	-	13.6	NA	NA	1,100	No

### COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

#### PAGE 2 OF 2

#### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
- 6 Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 7 Value is for acenaphthene.
- 8 Value is for pyrene.
- 9 Value is for hexavalent chromium.
- 10 Value is MCL based soil screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

#### **Associated Samples**

DSY-S-MW06-SS01

DSY-SO-SB208-000.5

DSY-SO-SB208-000.5-D

DSY-SO-SB209-0.30.7

DSY-SO-SB215-000.5

DSY-SO-SB216-000.5

DSY-SO-SB217-000.5

DSY-SO-SB224-000.5

DSY-SO-SB224-000.5-D

B6-S1

#### **Definitions:**

J = Estimated value

NA = Not Applicable/Not Available

## TABLE 5-27 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
	Aromatic Hydrocarbons		_		T = =	-	1			1	T	1	
	2-Methylnaphthalene	3.38 J	281	ug/kg	DSY-SO-SB214-0203	3/6	3.83 - 360	281	NA	23,000 N	123,000	No	BSL
83-32-9	Acenaphthene	2.87 J	2.87 J	ug/kg	DSY-SO-SB213-0203	1/6	3.53 - 360	2.87	NA	340,000 N	43,000	No	BSL
208-96-8	Acenaphthylene	3.5 J	47.2	ug/kg	DSY-SO-SB214-0203	4/6	3.9 - 360	47.2	NA	340,000 N <sup>(8)</sup>	23,000	No	BSL
120-12-7	Anthracene	4.71 J	17.2	ug/kg	DSY-SO-SB212-0204	3/6	4.11 - 360	17.2	NA NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	32.5	252	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	252	NA NA	150 C	900	Yes	ASL
50-32-8 205-99-2	Benzo(a)pyrene Benzo(b)fluoranthene	18.9 26.6	172 336	ug/kg ug/kg	DSY-SO-SB214-0203 DSY-SO-SB214-0203	6/7 6/7	360 - 360 360 - 360	172 336	NA NA	15 C 150 C	400 900	Yes Yes	ASL ASL
<u> </u>	` '				DSY-SO-SB214-0203				NA NA	170,000 N <sup>(9)</sup>			BSL
191-24-2 207-08-9	Benzo(g,h,i)perylene Benzo(k)fluoranthene	10.7 J 11.3 J	91.1 124	ug/kg	DSY-SO-SB214-0203	6/7 6/7	360 - 360 360 - 360	91.1 124	NA NA	1,500 C	800 900	No No	BSL
218-01-9	Chrysene	20.5	356	ug/kg ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	356	NA NA	15,000 C	400	No	BSL
53-70-3	Dibenzo(a,h)anthracene	7.48 J	43.7	ug/kg ug/kg	DSY-SO-SB214-0203	3/6	3.83 - 360	43.7	NA NA	15,000 C	400	Yes	ASL
206-44-0	Fluoranthene	39.6	451	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	451	NA NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	2.22 J	8.85 J	ug/kg	DSY-SO-SB212-0204	3/6	4.11 - 360	8.85	NA NA	230,000 N	28,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	10.2 J	82.7	ug/kg	DSY-SO-SB214-0203	5/6	360 - 360	82.7	NA	150 C	900	No	BSL
91-20-3	Naphthalene	2.5 J	175	ug/kg	DSY-SO-SB214-0203	4/6	3.9 - 360	175	NA	3,600 C	54,000	No	BSL
85-01-8	Phenanthrene	24.8	400	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	400	NA	170,000 N <sup>(9)</sup>	40,000	No	BSL
129-00-0	Pyrene	33.9	375	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	375	NA	170,000 N	13,000	No	BSL
Pesticides/F	•	l	<u> </u>	0 0		I	I	l		,	,		
1336-36-3	Total Aroclors	95	95	ug/kg	B6-S6	1/6	17.2 - 26.9	95	NA	220 C	10,000	No	BSL
Metals													
	Aluminum	2,180	19,900	mg/kg	DSY-S-MW06-0406	6/6	-	19,900	13,075	7,700 N	NA	Yes	ASL
	Antimony	1.15 J	1.15 J	mg/kg	DSY-SO-SB214-0203	1/6	0.428 - 17.6	1.15	ND	3.1 N	10	No	BSL
	Arsenic	1.47 J	47.2 J	mg/kg	DSY-SO-SB214-0203	7/7	-	47.2	20	0.39 C	7	Yes	ASL
·	Barium	5.5 J	57.7 J	mg/kg	DSY-SO-SB214-0203	6/6	-	57.7	36	1,500 N	5,500	No	BSL
	Beryllium	0.507 J	0.759	mg/kg	DSY-SO-SB214-0203	5/6	0.34 - 0.34	0.759	0.64	16 N	1.5	No	BSL
	Cadmium	0.0903 J	1.4	mg/kg	B6-S6	2/7	0.107 - 1	1.4	0.23	7 N	39	No	BSL
7440-70-2		279 J	2,040 J	mg/kg	DSY-SO-SB214-0203	6/6	-	2,040	1,689	NA (10)	NA (10)	No	NUT
	Chromium	0.788 J	25.6 J	mg/kg	DSY-S-MW06-0406	7/7	-	25.6	18	0.29 C <sup>(10)</sup>	390 (10)	Yes	ASL
7440-48-4		1.29 J	24	mg/kg	DSY-S-MW06-0406	6/6	-	24	17	2.3 N	NA 2.400	Yes	ASL
7440-50-8 7439-89-6		1.67 J 6,800	39.5 J 43,600	mg/kg	DSY-SO-SB214-0203 DSY-S-MW06-0406	6/6 6/6	-	39.5 43,600	24 39,173	310 N <b>5,500 N</b>	3,100 NA	No	BSL ASL
	Lead	2.49 J	43,600 81.4 J	mg/kg mg/kg	DSY-SO-SB214-0203	7/7	-	81.4	39,173 12	<b>3,300 N</b>	150	<b>Yes</b> No	BSL
	Magnesium	646	7,130	mg/kg	DSY-S-MW06-0406	6/6	-	7,130	3,811	NA	NA	No	NUT
	Manganese	305	1,190	mg/kg	DSY-SO-SB214-0203	6/6	-	1,190	1,037	180 N	390	Yes	ASL
7439-90-5		0.0138 J	0.0603	mg/kg	DSY-SO-SB214-0203	3/6	0.0276 - 0.05	0.0603	0.012	2.3 N <sup>(11)</sup>		No	BSL
7439-97-0	·	0.596	39.7	mg/kg	DSY-S-MW06-0406	6/6	-	39.7	28	150 N	1,000	No	BSL
<u> </u>	Potassium	166	681 J	mg/kg	DSY-SO-SB212-0204	6/6	_	681	1,699	NA	NA	No	NUT, BKG
7782-49-2		0.67	1.31	mg/kg	DSY-SO-SB214-0203	2/6	0.268 - 1.49	1.31	0.286	39 N	390	No	BSL
7440-23-5		90.6 J	90.6 J	mg/kg	DSY-SO-SB214-0203	1/5	161 - 179	90.6	83	NA NA	NA NA	No	NUT
7440-62-2		3.97	20.6	mg/kg	DSY-SO-SB213-0203	6/6	-	20.6	23	39 N	550	No	BSL, BKG
7440-66-6		27.1 J	335 J	mg/kg	DSY-SO-SB214-0203	6/6	-	335	66	2,300 N	6,000	No	BSL

### OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>	
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#### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for acenaphthene.
- 9 Value is for pyrene.
- 10 Value is for hexavalent chromium.
- 11 Value is for mercuric chloride (and other mercury salts).

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

#### **Associated Samples**

DSY-S-MW06-0406

DSY-SO-SB210-0102

DSY-SO-SB211-0102

DSY-SO-SB212-0204

DSY-SO-SB213-0203

DSY-SO-SB214-0203

B6-S6

#### Definitions:

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

#### **Rationale Codes:**

For selection as a COPC:

ASL = Above Screening Level and site background.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

# TABLE 5-28 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	USEPA RSL Migration from Soil to Groundwater <sup>(5)</sup>	RIDEM GA Leachability Criteria <sup>(6)</sup>	Exceeds Screening Criteria?
	Aromatic Hydrocarbons											
	2-Methylnaphthalene	3.38 J	281	ug/kg	DSY-SO-SB214-0203	3/6	3.83 - 360	281	NA	140	NA	Yes
83-32-9	Acenaphthene	2.87 J	2.87 J	ug/kg	DSY-SO-SB213-0203	1/6	3.53 - 360	2.87	NA	4,100	NA	No
208-96-8	Acenaphthylene	3.5 J	47.2	ug/kg	DSY-SO-SB214-0203	4/6	3.9 - 360	47.2	NA	4,100 <sup>(7)</sup>	NA	No
	Anthracene	4.71 J	17.2	ug/kg	DSY-SO-SB212-0204	3/6	4.11 - 360	17.2	NA NA	42,000	NA NA	No
	Benzo(a)anthracene	32.5	252	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	252	NA NA	10	NA	Yes Yes
	Benzo(a)pyrene Benzo(b)fluoranthene	18.9 26.6	172 336	ug/kg	DSY-SO-SB214-0203 DSY-SO-SB214-0203	6/7 6/7	360 - 360 360 - 360	172 336	NA NA	3.5 35	240,000 NA	Yes
				ug/kg		6/7				9,500 <sup>(8)</sup>		
191-24-2 207-08-9	Benzo(g,h,i)perylene Benzo(k)fluoranthene	10.7 J 11.3 J	91.1 124	ug/kg ug/kg	DSY-SO-SB214-0203 DSY-SO-SB214-0203	6/7	360 - 360 360 - 360	91.1 124	NA NA	350	NA NA	No No
218-01-9	Chrysene	20.5	356	ug/kg ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	356	NA NA	1,100	NA NA	No
	Dibenzo(a,h)anthracene	7.48 J	43.7	ug/kg ug/kg	DSY-SO-SB214-0203	3/6	3.83 - 360	43.7	NA NA	11	NA NA	Yes
	Fluoranthene	39.6	451	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	451	NA NA	70,000	NA NA	No
86-73-7	Fluorene	2.22 J	8.85 J	ug/kg	DSY-SO-SB212-0204	3/6	4.11 - 360	8.85	NA NA	4,000	NA NA	No
	Indeno(1,2,3-cd)pyrene	10.2 J	82.7	ug/kg	DSY-SO-SB214-0203	5/6	360 - 360	82.7	NA	120	NA	No
	Naphthalene	2.5 J	175	ug/kg	DSY-SO-SB214-0203	4/6	3.9 - 360	175	NA	0.47	800	Yes
85-01-8	Phenanthrene	24.8	400	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	400	NA	9,500 (8)	NA	No
	Pyrene	33.9	375	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	375	NA	9,500	NA	No
Pesticides/	PCBs					•				•		•
1336-36-3	<b>Total Aroclors</b>	95	95	ug/kg	B6-S6	1/6	17.2 - 26.9	95	NA	26	10,000	Yes
Metals												
7429-90-5		2,180	19,900	mg/kg	DSY-S-MW06-0406	6/6	-	19,900	13,075	23,000	NA	No
7440-36-0		1.15 J	1.15 J	mg/kg	DSY-SO-SB214-0203	1/6	0.428 - 17.6	1.15	ND	0.27	NA	Yes
7440-38-2		1.47 J	47.2 J	mg/kg	DSY-SO-SB214-0203	7/7	-	47.2	20	0.0013	NA	Yes
7440-39-3		5.5 J	57.7 J	mg/kg	DSY-SO-SB214-0203	6/6	-	57.7	36	120	NA	No
	Beryllium	0.507 J	0.759	mg/kg	DSY-SO-SB214-0203 B6-S6	5/6 2/7	0.34 - 0.34	0.759	0.64	13 <b>0.52</b>	NA NA	No Yes
7440-43-9 7440-70-2		0.0903 J 279 J	1.4 2,040 J	mg/kg	DSY-SO-SB214-0203	6/6	0.107 - 1	1.4 2,040	0.23 1,689	0.52 NA	NA NA	No
	Chromium			mg/kg	DSY-S-MW06-0406	7/7	-	·		0.00059 <sup>(9)</sup>		
7440-47-3		0.788 J 1.29 J	25.6 J 24	mg/kg	DSY-S-MW06-0406	6/6	-	25.6 24	18 17	0.00059	NA NA	Yes Yes
7440-46-4		1.67 J	39.5 J	mg/kg mg/kg	DSY-SO-SB214-0203	6/6	-	39.5		22	NA NA	Yes
7439-89-6		6,800	43,600	mg/kg	DSY-S-MW06-0406	6/6	-	43,600	24 39,173	270	NA NA	Yes
7439-92-1		2.49 J	81.4 J	mg/kg	DSY-SO-SB214-0203	7/7	_	81.4	12	14 <sup>(10)</sup>	NA NA	Yes
	Magnesium	646	7,130	mg/kg	DSY-S-MW06-0406	6/6	-	7,130	3,811	NA	NA NA	No
	Manganese	305	1,190	mg/kg	DSY-SO-SB214-0203	6/6	_	1,190	1,037	21	NA NA	Yes
7439-97-6		0.0138 J	0.0603	mg/kg	DSY-SO-SB214-0203	3/6	0.0276 - 0.05	0.0603	0.012	0.033	NA NA	Yes
7440-02-0		0.596	39.7	mg/kg	DSY-S-MW06-0406	6/6	-	39.7	28	20	NA	Yes
7440-09-7		166	681 J	mg/kg	DSY-SO-SB212-0204	6/6	-	681	1,699	NA	NA	No
7782-49-2		0.67	1.31	mg/kg	DSY-SO-SB214-0203	2/6	0.268 - 1.49	1.31	0.286	0.4	NA	Yes
7440-23-5		90.6 J	90.6 J	mg/kg	DSY-SO-SB214-0203	1/5	161 - 179	90.6	83	NA	NA	No
7440-62-2		3.97	20.6	mg/kg	DSY-SO-SB213-0203	6/6	-	20.6	23	78	NA	No
7440-66-6	Zinc	27.1 J	335 J	mg/kg	DSY-SO-SB214-0203	6/6	-	335	66	290	NA	Yes

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

#### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
- 6 Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 7 Value is for acenaphthene.
- 8 Value is for pyrene.
- 9 Value is for hexavalent chromium.
- 10 Value is MCL based soil screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

#### **Associated Samples**

DSY-S-MW06-0406

DSY-SO-SB210-0102

DSY-SO-SB211-0102

DSY-SO-SB212-0204

DSY-SO-SB213-0203

DSY-SO-SB214-0203

B6-S6

#### **Definitions:**

J = Estimated value

NA = Not Applicable/Not Available

#### **TABLE 5-29** CHEMICALS RETAINED AS COPCS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

		N	orth Waterfro	ont			Central	Shipyard			Buildi	ng 234		South Waterfront	PCB R	Removal Area
Chemical	Surface	Subsurface		ndwater	Soil Gas	Surface	Subsurface	Groun	dwater	Surface	Subsurface		dwater	Subsurface	Surface	
	Soil	Soil	Direct Contact	Vapor Intrusion	Vapor Intrusion	Soil	Soil	Direct Contact	Vapor Intrusion	Soil	Soil	Direct Contact	Vapor Intrusion	Soil	Soil	Subsurface Soil
Volatile Organic Compounds				•	•		•		•				•			•
1,3-Butadiene					Е											
Acrylonitrile					Е											
Benzene					Е											
cis-1,2-Dichloroethene			E									E				
Trichloroethene			E,R	E	E							E	E			
Vinyl Chloride			Ē	Е								E,R	Е			
Semivolatile Organic Compounds							-									
Benzo(a)anthracene	E					E	E,R			E					E,R	E
Benzo(a)pyrene	E,R	E				E	E,R			E,R	Е				E,R	Е
Benzo(b)fluoranthene	E,R					E	E,R			Ē					E,R	Е
Benzo(g,h,i)perylene															R	
Benzo(k)fluoranthene															E,R	
Chrysene	R					R	R			R					R	
Dibenzo(a,h)anthracene	Е	Е					Е			Е					E,R	Е
Hexachloroethane															,	
Indeno(1,2,3-cd)pyrene	Е						Е			Е					E,R	
Pesticides/PCBs		•		•	•		•		•		•		•		,	
Aroclor-1260															Е	
Total Aroclors															Е	
Inorganics		•		•	•				•		•		•			•
Aluminum		E	E				E	E			E	E		E		E
Arsenic			E,R			E,R	E,R	E,R		E,R	E,R	E,R		E,R	E,R	E,R
Beryllium										R		•			•	·
Cadmium								E		Е						
Chromium	Е	Е	Е			Е	Е	E		Е	E	Е		Е		Е
Cobalt	Е	Е				Е	Е	E		Е	E	Е		Е	Е	Е
Iron	Е	Е	Е			Е	Е	E		Е	Е	Е		Е	Е	Е
Lead										R						
Manganese			E			E,R		E		E,R	E,R	Е			E,R	E,R

E - Chemical exceeded USEPA screening criteria and was retained as a COPC. R - Chemical exceeded RIDEM screening criteria and was retained as a COPC.

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## TABLE 5-30 SELECTION OF EXPOSURE PATHWAYS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 4

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Surface Soil	Surface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Industrial workers may contact surface soil during normal work activities.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	Quant Quant	
					Adult	Ingestion Dermal	Quant Quant	Trespassers may contact surface soil while at the site.
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	Quant	Industrial workers may be exposed to fugitive dust and volatile emissions during work activities.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Trespassers	Adolescents	Inhalation	Quant	
					Adult	Inhalation	Quant	Trespassers may be exposed to fugitive dust and volatile emissions while at the site.
	Subsurface Soil	Subsurface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	None None	Current industrial workers are not exposed to subsurface soil.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	None None	Current trespassers are not exposed to subsurface soil.
					Adult	Ingestion Dermal	None None	Outlent trespassers are not exposed to subsurface son.
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	None	Current industrial workers are not exposed to subsurface soil.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trespassers	Adolescents	Inhalation	None	Current treenessers are not exposed to subsurface call
					Adult	Inhalation	None	Current trespassers are not exposed to subsurface soil.
	Groundwater	Groundwater	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	None None	Current industrial workers are not exposed to groundwater.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with ground water during excavation activities.
				Trespassers Users	Adolescents	Ingestion Dermal	None None None None None None	Current transport on and automated to around unter
					Adult	Ingestion Dermal		Tourient trespassers are not exposed to groundwater.

## TABLE 5-30 SELECTION OF EXPOSURE PATHWAYS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 4

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	None	Current industrial workers are not exposed to groundwater.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Trespassers	Adolescents	Inhalation	None	Current transports are not appeared to project units
					Adult	Inhalation	None	Current trespassers are not exposed to groundwater.
	,		Vapor Intrusion	Industrial Worker	Adult	Inhalation	None	At present there are no buildings on the site.
Future	Surface Soil	Surface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Industrial workers may contact surface soil during normal work activities.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	Quant Quant	Transport may control surface of the state of
					Adult	Ingestion Dermal	Quant Quant	Trespassers may contact surface soil while at the site.
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site
					Adult	Ingestion Dermal	Quant Quant	this scenario is included to aid in future risk management decisions.
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	Quant	Industrial workers may be exposed to fugitive dust and volatile emissions during work activities.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Trespassers	Adolescents	Inhalation	Quant	Transporter may be a proposed to firstify a dust and polatile amineione public at the site
					Adult	Inhalation	Quant	Trespassers may be exposed to fugitive dust and volatile emissions while at the site.
				Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site
					Adult	Inhalation	Quant	this scenario is included to aid in future risk management decisions.
	Subsurface Soil	Subsurface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by industrial workers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.

## TABLE 5-30 SELECTION OF EXPOSURE PATHWAYS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 4

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Subsurface Soil	Subsurface Soil	Derecktor Shipyard	Trespassers	Adolescents	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by trespassers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	scenario is included to ald in titule lisk management decisions.
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site
					Adult	Ingestion Dermal	Quant Quant	this scenario is included to aid in future risk management decisions.
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	Quant	Although exposures to subsurface soil by industrial workers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trespassers	Adolescents	Inhalation	Quant	Although exposures to subsurface soil by trespassers is considered unlikely at the site this
					Adult	Inhalation	Quant	scenario is included to aid in future risk management decisions.
				Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site
					Adult	Inhalation	Quant	this scenario is included to aid in future risk management decisions.
Future	Groundwater	Groundwater	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Future industrial workers may be exposed to groundwater if groundwater was used as a water supply.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Trespassers	Adolescents	Ingestion	None	
				Users		Dermal	None	Future trespassers are not expected to be exposed to groundwater.
					Adult	Ingestion Dermal	None None	
				Residents	Child	Ingestion	Quant	
				Nesidents	Offilia	Dermal	Quant	Although a future residential scenario is considered unlikely at the site
					Adult	Ingestion	Quant	this scenario is included to aid in future risk management decisions.
						Dermal	Quant	
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	None	Future industrial workers are not exposed to be exposed to COPCs that have volatilized from groundwater.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Trespassers	Adolescents	Inhalation	None	
					Adult	Inhalation	None Future trespassers are not expected to be exposed to groundwater.	Future trespassers are not expected to be exposed to groundwater.

## TABLE 5-30 SELECTION OF EXPOSURE PATHWAYS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 OF 4

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway	
Future	Groundwater	Air	Derecktor Shipyard	Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site	
					Adult	Inhalation	Quant		
			Vapor Intrusion	Industrial Worker	Adult	Inhalation	Qual	Future industrial workers could be exposed to COPCs that have volatilized from groundwater and migrated through building foundations and into indoor air.	
				Residents	Child	Inhalation	Qual	0 0	
					Adult	Inhalation	Qual	migrated through building foundations and into indoor air.	

Notes:

Qual - Qualitative.

Quant - Quantitative.

## TABLE 5-31 RECEPTORS AND EXPOSURE ROUTES FOR QUANTITATIVE EVALUATION FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Receptors	Exposure Routes
Industrial Worker	Soil incidental ingestion
(current/future land use)	Soil dermal contact
	Inhalation of air/dust emissions
	Direct ingestion of groundwater
	Groundwater dermal contact
Construction Workers	Soil incidental ingestion
(current/future land use)	Soil dermal contact
	Inhalation of air/dust emissions
	Groundwater incidental ingestion (during excavation)
	Groundwater dermal contact (during excavation)
	Groundwater inhalation of volatile organics (during excavation)
Trespassers (Adolescent/Adults)	Soil incidental ingestion
(current/future land use)	Soil dermal contact
	Inhalation of air/dust emissions
Hypothetical Residents (Children/Adult)	Soil incidental ingestion
(future land use)	Soil dermal contact
	Inhalation of air/dust emissions
	Direct ingestion of groundwater
	Groundwater dermal contact (showering/bathing)
	Inhalation of volatiles in groundwater (showering/bathing)

#### **TABLE 5-32 EXPOSURE POINT CONCENTRATIONS** FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

		North W	aterfront			Central	Shipyard			Former B	uilding 234		South Waterfront		PCB Removal A	rea
Chemical	Surfac	ce Soil	Subsurface	Groundwater	Surfa	ce Soil	Subsurface	Groundwater	Surfa	ce Soil	Subsurface	Groundwater	Subsurface	Surfac	ce Soil	Subsurface
	Unpaved	All	Soil		Unpaved	All	Soil		Unpaved	All	Soil		Soil	Unpaved	All	Soil
	(mg/kg)	(mg/kg)	(mg/kg)	(ug/L)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/L)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/L)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Volatile Organic Compounds		_	_	_		_										
cis-1,2-Dichloroethene	NA	NA	NA	4.26 <sup>(1)</sup>	NA	12.7 <sup>(1)</sup>	NA	NA	NA	NA						
Trichloroethene	NA	NA	NA	12.2 <sup>(1)</sup>	NA	3.9 <sup>(1)</sup>	NA	NA	NA	NA						
Vinyl Chloride	NA	NA	NA	1.47 <sup>(1)</sup>	NA	0.263 <sup>(1)</sup>	NA	NA	NA	NA						
Semivolatile Organic Compounds																
Benzo(a)anthracene	0.232 <sup>(1)</sup>	0.207 <sup>(2)</sup>	NA	NA	ND-Soil	0.30 <sup>(2)</sup>	0.278 <sup>(2)</sup>	NA	0.324 <sup>(2)</sup>	0.3 <sup>(2)</sup>	NA	NA	NA	0.13 <sup>(1)</sup>	5.74 <sup>(1)</sup>	0.146 <sup>(3)</sup>
Benzo(a)pyrene	0.165 <sup>(1)</sup>	0.161 <sup>(2)</sup>	0.044 <sup>(1)</sup>	NA	ND-Soil	0.14 <sup>(1)</sup>	0.194 <sup>(2)</sup>	NA	0.288 <sup>(2)</sup>	0.27 <sup>(2)</sup>	0.055 <sup>(1)</sup>	NA	NA	0.12 <sup>(1)</sup>	4.92 <sup>(1)</sup>	0.167 <sup>(4)</sup>
Benzo(b)fluoranthene	0.263 <sup>(1)</sup>	0.251 <sup>(2)</sup>	NA	NA	ND-Soil	0.34 <sup>(2)</sup>	0.247 <sup>(2)</sup>	NA	0.477 <sup>(2)</sup>	0.43 <sup>(2)</sup>	NA	NA	NA	0.18 <sup>(1)</sup>	7.12 <sup>(1)</sup>	0.322 <sup>(4)</sup>
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.072 <sup>(1)</sup>	2.07 <sup>(1)</sup>	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.086 <sup>(1)</sup>	2.48 <sup>(1)</sup>	NA
Chrysene	0.238 <sup>(1)</sup>	0.209 <sup>(2)</sup>	NA	NA	ND-Soil	0.30 <sup>(2)</sup>	0.282(2)	NA	0.409 <sup>(2)</sup>	0.36 <sup>(2)</sup>	NA	NA	NA	0.14 <sup>(1)</sup>	5.65 <sup>(1)</sup>	NA
Dibenzo(a,h)anthracene	0.124 <sup>(1)</sup>	0.124 <sup>(1)</sup>	0.0233 <sup>(1)</sup>	NA	NA	NA	0.046 <sup>(1)</sup>	NA	0.062 <sup>(1)</sup>	0.062 <sup>(1)</sup>	NA	NA	NA	0.017 <sup>(1)</sup>	0.82 <sup>(1)</sup>	0.044 <sup>(3)</sup>
Indeno(1,2,3-cd)pyrene	0.099 <sup>(1)</sup>	0.109 <sup>(2)</sup>	NA	NA	NA	NA	0.20 <sup>(2)</sup>	NA	0.18 <sup>(2)</sup>	0.18 <sup>(2)</sup>	NA	NA	NA	0.071 <sup>(1)</sup>	2.07 <sup>(1)</sup>	NA
Pesticides/PCBs		•	•			•				•	•	•				
Total Aroclors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0244 <sup>(1)</sup>	0.416 <sup>(1)</sup>	NA
Inorganics											_					
Aluminum	NA	NA	7,510 <sup>(6)</sup>	337 <sup>(1)</sup>	NA	NA	10,200 <sup>(5)</sup>	312 <sup>(1)</sup>	NA	NA	12,600 <sup>(5)</sup>	53.7 <sup>(1)</sup>	15,800 <sup>(5)</sup>	NA	NA	16,100 <sup>(5)</sup>
Arsenic	NA	NA	NA	ND-GW	24.4 <sup>(1)</sup>	23.7 <sup>(5)</sup>	18.4 <sup>(2)</sup>	78.1 <sup>(1)</sup>	17.9 <sup>(5)</sup>	16.4 <sup>(5)</sup>	23.3 <sup>(4)</sup>	1.32 <sup>(1)</sup>	23.7 <sup>(5)</sup>	21.7 <sup>(1)</sup>	21.8 <sup>(1)</sup>	35 <sup>(6)</sup>
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	3.2 <sup>(4)</sup>	3.5 <sup>(1)</sup>	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	1.53 <sup>(1)</sup>	13 <sup>(1)</sup>	13 <sup>(1)</sup>	NA	NA	NA	NA	NA	NA
Chromium	10.8 <sup>(7)</sup>	13.5 <sup>(4)</sup>	11 <sup>(6)</sup>	0.508 <sup>(1)</sup>	15.8 <sup>(1)</sup>	17.3 <sup>(5)</sup>	13.3 <sup>(5)</sup>	ND-GW	83 <sup>(6)</sup>	91.1 <sup>(10)</sup>	25.4 <sup>(6)</sup>	ND-GW	19.1 <sup>(5)</sup>	NA	NA	19.1 <sup>(5)</sup>
Cobalt	7.0 <sup>(2)</sup>	7.9 <sup>(2)</sup>	8.68 <sup>(3)</sup>	NA	14.7 <sup>(1)</sup>	14.6 <sup>(5)</sup>	12.3 <sup>(5)</sup>	24.8 <sup>(1)</sup>	20 <sup>(5)</sup>	17.8 <sup>(5)</sup>	13.3 <sup>(2)</sup>	1.74 <sup>(1)</sup>	23.8 <sup>(5)</sup>	22.7 <sup>(1)</sup>	22.7 <sup>(1)</sup>	18.7 <sup>(5)</sup>
Iron	18,800 <sup>(5)</sup>	17,425 <sup>(6)</sup>	20,100 <sup>(6)</sup>	605 <sup>(1)</sup>	31,800 <sup>(1)</sup>	32,500 <sup>(5)</sup>	26,900 <sup>(5)</sup>	65,800 <sup>(1)</sup>	32,100 <sup>(5)</sup>	30,020 <sup>(5)</sup>	31,600 <sup>(5)</sup>	459 <sup>(1)</sup>	32,100 <sup>(5)</sup>	30,600 <sup>(1)</sup>	32,000 <sup>(1)</sup>	37,600 <sup>(5)</sup>
Lead	NA	NA	NA	NA	NA	NA	NA	NA	53.9 <sup>(8)</sup>	53.6 <sup>(8)</sup>	NA	NA	NA	NA	NA	NA
Manganese	229(5)	NA	NA	53.9 <sup>(1)</sup>	448 <sup>(1)</sup>	435 <sup>(5)</sup>	NA	9,100 <sup>(1)</sup>	509 <sup>(5)</sup>	474 <sup>(5)</sup>	684 <sup>(6)</sup>	532 <sup>(1)</sup>	NA	619 <sup>(1)</sup>	619 <sup>(1)</sup>	872 <sup>(6)</sup>

#### Notes:

Appendix F.1 lists the samples that were used to calculate the EPCs.

NA - Not applicable. Not a COPC for this media.

ND-GW - Not detected in 2011 groundwater samples.

ND-Soil - Not detected in soil samples collected in the unpaved area in the Central Shipyard.

- 1 Maximum Detected Concentration
- 2 95% KM (t)
- 3 95% KM (BCA) 4 95% KM (Chebyshev) 5 95% Student's-t

- 6 95% Approximate Gamma 7 95% KM (Percentile Bootstrap)
- 8 Average Concentration 9 95% Modified-t

# TABLE 5-33 SUMMARY OF EXPOSURE INPUT PARAMETERS REASONABLE MAXIMUM EXPOSURES FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Parameter Code	Exposure Parameter	Construction Worker	Industrial Worker	Adolescent Trespasser	Adult Trespasser	Child Resident	Adult Resident
All Exposure	ļ PS	worker	worker	rrespasser	rrespasser	Resident	Resident
ED	Exposure Duration (years)	1 <sup>(1)</sup>	25 <sup>(2,3)</sup>	10 <sup>(4)</sup>	20 <sup>(4)</sup>	6 <sup>(2,3)</sup>	24 <sup>(2,3)</sup>
BW	Body Weight (kg)	70 <sup>(2)</sup>	70 <sup>(2,3)</sup>	50 <sup>(2)</sup>	70 <sup>(2)</sup>	15 <sup>(2,3)</sup>	70 <sup>(2,3)</sup>
AT-N	Averaging Time (Non-Cancer) (days)	365 <sup>(5)</sup>	9,125 <sup>(3,5)</sup>	4,380 <sup>(5)</sup>	8,760 <sup>(5)</sup>	2,190 <sup>(3,5)</sup>	8,760 <sup>(3,5)</sup>
AT-C	Averaging Time (Cancer) (days)	25,550 <sup>(5)</sup>	25,550 <sup>(3,5)</sup>	25,550 <sup>(5)</sup>	25,550 <sup>(5)</sup>	25,550 <sup>(3,5)</sup>	25,550 <sup>(3,5)</sup>
Incidental In	gestion/Dermal Contact with Soil						
$C_{soil}$	Exposure concentration for soil (mg/kg)	Maximum or 95% UCL <sup>(6)</sup>					
IR	Ingestion Rate (mg/day)	330 <sup>(2)</sup>	100 <sup>(2)</sup>	100 <sup>(2)</sup>	100 <sup>(2)</sup>	200 <sup>(1,3)</sup>	100 <sup>(1,3)</sup>
EF	Exposure Frequency (days/year)	130 <sup>(7)</sup>	250 <sup>(3,8)</sup>	48 <sup>(9)</sup>	48 <sup>(9)</sup>	350 <sup>(1)</sup>	350 <sup>(1)</sup>
FI	Fraction Ingested (unitless)	1	1	1	1	1	1
SA	Skin Surface Available for Contact (cm²)	3,300 <sup>(8)</sup>	3,300 <sup>(8)</sup>	5,500 <sup>(10)</sup>	5,700 <sup>(8)</sup>	2,800 <sup>(8)</sup>	5,700 <sup>(8)</sup>
AF	Soil to Skin Adherence Factor (mg/cm²/event)	0.3 <sup>(8)</sup>	0.2 <sup>(8)</sup>	0.4 <sup>(8)</sup>	0.07 <sup>(8)</sup>	0.2 <sup>(8)</sup>	0.07 <sup>(8)</sup>
ABS	Absorption Factor (unitless)	chemical- specific <sup>(8)</sup>					
CF	Conversion Factor (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Inhalation Fu	ugitive Dust/Volatile Emissions from Soil						
C <sub>air</sub>	Exposure concentration for air (mg/m³)	calculated <sup>(1)</sup>					
ET	Exposure Time (hours/day)	8 <sup>(7)</sup>	8 <sup>(11)</sup>	4 <sup>(9)</sup>	4 <sup>(9)</sup>	24	24
EF	Exposure Frequency (days/year)	130 <sup>(7)</sup>	250 <sup>(8)</sup>	48 <sup>(9)</sup>	48 <sup>(9)</sup>	350 <sup>(1,3)</sup>	350 <sup>(1,3)</sup>
PEF	Particulate Emission Factor (m <sup>3</sup> /kg)	1.4E+06 <sup>(1)</sup>	1.1E+10 <sup>(12)</sup>				
Ingestion/De	rmal Contact with Groundwater						
$C_gw$	Exposure concentration for groundwater (ug/L)	Maximum	Maximum	NA	NA	Maximum	Maximum
IR	Ingestion Rate (L/day)	0.05 <sup>(13)</sup>	1 <sup>(14)</sup>	NA	NA	1 <sup>(2)</sup>	2 <sup>(2)</sup>
EF	Exposure Frequency (days/year)	130 <sup>(7)</sup>	250 <sup>(3,8)</sup>	NA	NA	350 <sup>(1)</sup>	350 <sup>(1)</sup>
ET	Exposure Time (hours/day)	8 <sup>(7)</sup>	0.5 <sup>(13)</sup>	NA	NA	1.0 <sup>(8)</sup>	0.58 <sup>(8)</sup>
EV	Event Frequency (events/day)	1 <sup>(13)</sup>	1	NA	NA	1 <sup>(13)</sup>	1 <sup>(13)</sup>
SA	Skin Surface Available for Contact (cm²)	3,300 <sup>(8)</sup>	904 <sup>(15)</sup>	NA	NA	6,600 <sup>(8)</sup>	18,000 <sup>(8)</sup>
	Kp (cm/hour), t* (hour/event), τ (hour), and	chemical-	chemical-	NA	NA	chemical-	chemical-
	B (unitless)	specific <sup>(8)</sup>	specific <sup>(8)</sup>	14/1	14/1	specific <sup>(8)</sup>	specific <sup>(8)</sup>
	Volatile Emissions from Groundwater	(40)		T		T	1
C <sub>air</sub>	Exposure concentration for air (mg/m³)	calculated <sup>(16)</sup>	NA	NA	NA	NA	NA
ET	Exposure Time (hours/day)	8 <sup>(7)</sup>	NA	NA	NA	NA	NA

# TABLE 5-33 SUMMARY OF EXPOSURE INPUT PARAMETERS REASONABLE MAXIMUM EXPOSURES FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Parameter	Exposure Parameter	Construction	Industrial	Adolescent	Adult	Child	Adult
Code	Exposure Farameter	Worker	Worker	Trespasser	Trespasser	Resident	Resident
EF	Exposure Frequency (days/year)	130 <sup>(7)</sup>	NA	NA	NA	NA	NA
VF	Volatilization Factor (L/m³)	calculated <sup>(16)</sup>	NA	NA	NA	0.5 <sup>(14)</sup>	0.5 <sup>(14)</sup>

#### Notes:

- 1 USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9365.4-24.
- 2 USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.
- 3 Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 4 Adolescent ages 6 to 16 years old and an adult ages 16 to 36 years old for a total exposure duration of 30 years.
- 5 USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.
- 6 USEPA, 2002. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.
- 7 Assumes a 26 week construction project over a course of one year.
- 8 USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. PA/540/R/99/005.
- 9 Assumes 4 hours a day, 2 days a week for 24 weeks (mid-April through mid-October).
- 10 Assumes assumes that the head, forearms, hands, lower legs, and feet are exposed (USEPA, 1997).
- 11 Length of a typical work day.
- 12 USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.lsd.ornl.gov/calc\_start.htm. Site-specific values for Hartford, Connecticut.
- 13 Professional judgment.
- 14 USEPA, 1991. Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part B, Development of Risk-Based Preliminary Remediation Goals.
- 15 Represents hands of the industrial worker, USEPA, 2004.
- 16 VDEQ September 2004. Virginia Department of Environmental Quality (VDEQ, online -http://www.deg.state.va.us/brownfieldweb/vrp.html).

### TABLE 5-34 INTERMEDIATE VARIABLES FOR CALCULATING DA(EVENT) FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical of	Media	Dermal Absorption	FA	K	р	T(ev	/ent)	Ta	au	Т	*	В
Potential Concern		Fraction (soil)	Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Volatile Organic Compounds												
cis-1,2-Dichloroethene	Groundwater	0	1	1.1E-02	cm/hr	(1)	hr	3.7E-01	hr	8.8E-01	hr	4.1E-02
Tetrachloroethene	Groundwater	0	1	3.3E-02	cm/hr	(1)	hr	9.1E-01	hr	2.2E+00	hr	1.7E-01
Total 1,2-Dichloroethene	Groundwater	0	1	7.7E-03	cm/hr	(1)	hr	3.7E-01	hr	8.9E-01	hr	2.9E-02
Trichloroethene	Groundwater	0	1	1.2E-02	cm/hr	(1)	hr	5.8E-01	hr	1.4E+00	hr	5.1E-02
Vinyl Chloride	Groundwater	0	1	5.6E-03	cm/hr	(1)	hr	2.4E-01	hr	5.7E-01	hr	1.7E-02
Semivolatile Organic Compou	ınds											
Benzo(a)anthracene	Soil	0.13	NA <sup>(2)</sup>									
Benzo(a)pyrene	Soil	0.13	NA <sup>(2)</sup>									
Benzo(b)fluoranthene	Soil	0.13	NA <sup>(2)</sup>									
Benzo(g,h,i)perylene	Soil	0.13	NA <sup>(2)</sup>									
Benzo(k)fluoranthene	Soil	0.13	NA <sup>(2)</sup>									
Chrysene	Soil	0.13	NA <sup>(2)</sup>									
Dibenzo(a,h)anthracene	Soil	0.13	NA <sup>(2)</sup>									
Indeno(1,2,3-cd)pyrene	Soil	0.13	NA <sup>(2)</sup>									
PCBs												
Total Aroclors	Soil	0.14	NA <sup>(2)</sup>									
Inorganics		•		•				•		•	•	
Aluminum	Soil, Groundwater	0	1	1.0E-03	cm/hr	NA						
Arsenic	Soil, Groundwater	0.03	1	1.0E-03	cm/hr	NA						
Beryllium	Soil	0	1	1.0E-03	cm/hr	NA						
Cadmium	Soil	0.001	1	1.0E-03	cm/hr	NA						
Chromium VI	Soil, Groundwater	0	1	2.0E-03	cm/hr	NA						
Cobalt	Soil, Groundwater	0	1	4.0E-04	cm/hr	NA						
Iron	Soil, Groundwater	0	1	1.0E-03	cm/hr	NA						
Manganese	Soil, Groundwater	0	11	1.0E-03	cm/hr	NA						

#### Notes

All values from EPA's Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final, July 2004.

- 1 T(event) is 8 hrs for the construction worker; 0.5 hr for industrial workers, 1 hr for RME for hypothetical child residents; and 0.58 hrs for hypothetical adult residents.
- 2 RAGS Part E recommends not attempting to quantify risk because contaminants are outside the effective predictive domain of the model.

FA = Fraction Absorbed Water

Kp = Dermal Permeability Coefficient of Compound in Water

T(event) = Event Duration

Tau = Lag Time

T\* = Time to Reach Steady-State

B = Dimensionless Ratio of the Permeability Coefficient of a Compound Through the Stratum Corneum Relative to its Permeability Coefficient Across the Viable Epidermis

NA = Not applicable.

# TABLE 5-35 CHEMICAL PROPERTIES FOR VOLATILIZATION FROM GROUNDWATER TO OUTDOOR AIR MODELS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical	Molecular Weight (g/mole)	Henry's Law Constant (atm-m³/mol)
cis-1,2-Dichloroethene	9.69E+01	4.08E-03
Tetrachloroethene	1.66E+02	1.77E-02
Trichloroethene	1.31E+02	9.85E-03
Vinyl Chloride	6.25E+01	2.78E-02

#### Source:

USEPA 2012: USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May.

## TABLE 5-36 NON-CANCER TOXICITY DATA -- ORAL/DERMAL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Chemical of Potential	Chronic/ Subchronic	Ora	I RfD	Oral Absorption Efficiency	Absorbed Rf	D for Dermal <sup>(2)</sup>	Primary Target	Combined Uncertainty/Modifying	RfD:Ta	rget Organ(s)
Concern		Value	Units	for Dermal <sup>(1)</sup>	Value	Units	Organ(s)	Factors	Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds	•		•	•			-			
cis-1.2-Dichloroethene	Subchronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Kidney	300/1	PPRTV	2/3/2011
CIS-1,2-DICHIOIOETHERIE	Chronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	Kidney	3000/1	IRIS	9/21/2012
Tetrachloroethene	Subchronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Liver	100/1	HEAST	9/97
retracilloroethene	Chronic	6.0E-03	mg/kg/day	1	6.0E-03	mg/kg/day	Neurotoxicity	1000/1	IRIS	9/21/2012
Trichloroethene	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Immune System, Developmental	10 - 1000	IRIS	9/21/2012
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Liver	30/1	IRIS	9/21/2012
Semivolatile Organic Compou	nds			•						
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene(3)	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Kidney	3000/1	IRIS	9/21/2012
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs										
Total Aroclors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics			•	•		•				•
Aluminum	Subchronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Central Nervous System	30/1	ATSDR	9/2008
Addinition	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Central Nervous System	100	PPRTV	10/23/2006
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, Cardiovascular System	3/1	IRIS	9/21/2012
D W	Subchronic	5.0E-03	mg/kg/day	0.007	3.5E-05	mg/kg/day	Gastrointestinal System	100/1	HEAST	9/97
Beryllium	Chronic	2.0E-03	mg/kg/day	0.007	1.4E-05	mg/kg/day	Gastrointestinal System	300/1	IRIS	9/21/2012
Cadmium	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Kidney	10/1	IRIS	9/21/2012
Chromium <sup>(4)</sup>	Subchronic	2.0E-02	mg/kg/day	0.025	5.0E-04	mg/kg/day	None Reported	100/3	HEAST	9/97
	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	None Reported	300/3	IRIS	6/3/2011
Cobalt	Subchronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Thyroid	300/1	PPRTV	8/25/2008
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Thyroid	3000/1	PPRTV	8/25/2008
Iron	Subchronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
*****	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese <sup>(5)</sup>	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	Central Nervous System	1	IRIS	6/3/2011

## TABLE 5-36 NON-CANCER TOXICITY DATA -- ORAL/DERMAL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

#### Notes:

1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.

- 2 Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
- 3 Pyrene is used as a surrogate for benzo(g,h,i)perylene.
- 4 Values are for hexavalent chromium.
- 5 Adjusted IRIS value in accordance with IRIS.

Definitions:

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

NA = Not Available.

ATSDR = Agency for Toxic Substances and Disease Registry.

PPRTV = Provisional Peer Reviewed Toxicity Value.

## TABLE 5-37 NON-CANCER TOXICITY DATA -- INHALATION FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Chemical of Potential	Chronic/ Subchronic	Inhalat	ion RfC	Extrapol	ated RfD <sup>(1)</sup>	Primary Target	Combined Uncertainty/Modifying	RfC : Target Organ(s)		
Concern		Value	Units	Value	Units	Organ(s)	Factors	Source(s)	Date(s) (MM/DD/YYYY)	
Volatile Organic Compounds	•			•					,	
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Tetrachloroethene	Chronic	4.0E-02	mg/m <sup>3</sup>	1.1E-02	(mg/kg/day)	Neurotoxicity	1000/1	IRIS	9/21/2012	
Trichloroethene	Subchronic	5.4E-01	mg/m <sup>3</sup>	1.5E-01	(mg/kg/day)	Central Nervous System	300/1	ATSDR	9/1997	
Trichioroethene	Chronic	2.0E-03	mg/m <sup>3</sup>	5.7E-04	(mg/kg/day)	Immune System, Developmental	10 - 100	IRIS	9/21/2012	
Vinyl Chloride	Chronic	1.0E-01	mg/m <sup>3</sup>	2.9E-02	(mg/kg/day)	Liver	30/1	IRIS	9/21/2012	
Semivolatile Organic Compounds					-					
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	
PCBs					-					
Total Aroclors	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Inorganics					-					
Aluminum	Chronic	5.0E-03	mg/m3	1.4E-03	(mg/kg/day)	Central Nervous System	300/1	PPRTV	10/23/2006	
Arsenic	Chronic	1.5E-05	mg/m3	4.3E-06	(mg/kg/day)	Skin, Cardiovascular System	NA	Cal EPA(1)	9/2009	
Beryllium	Chronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Respiratory	10/1	IRIS	9/21/2012	
Cadmium	Chronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Kidney, Respiratory	NA	Cal EPA(2)	12/2008	
Chromium <sup>(2)</sup>	Chronic	1.0E-04	mg/m3	2.9E-05	(mg/kg/day)	Respiratory	300/1	IRIS	9/21/2012	
Cobalt	Subchronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Respiratory	100/1	PPRTV	8/25/2008	
CODAIL	Chronic	6.0E-06	mg/m3	1.7E-06	(mg/kg/day)	Respiratory	300/1	PPRTV	8/25/2008	
Iron	NA	NA	NA	NA	NA	NA NA	NA	NA	NA	
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Manganese	Chronic	5.0E-05	mg/m <sup>3</sup>	1.4E-05	(mg/kg/day)	Central Nervous System	1000/1	IRIS	9/21/2012	

## TABLE 5-37 NON-CANCER TOXICITY DATA -- INHALATION FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

#### Notes:

- 1 Extrapolated RfD = RfC \*20m3/day / 70 kg
- 2 Values are for hexavalent chromium.

#### Definitions:

IRIS = Integrated Risk Information System

NA = Not Applicable

ATSDR = Agency for Toxic Substances and Disease Registry.

Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

Cal EPA(2) = Technical Support Document For the Derivation of Noncancer Reference Exposure Levels, December 2008.

HEAST = Health Effects Assessment Summary Tables

NYSDOH = Final Report, Trichloroethene Air Criteria Document, New "York State Department of Health, October, 2006

PPRTV = Provisional Peer Reviewed Toxicity Value.

# TABLE 5-38 CANCER TOXICITY DATA -- ORAL/DERMAL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Chemical of Potential	Oral Cance	Slope Factor	Oral Absorption Efficiency		cer Slope Factor ermal <sup>(2)</sup>	Weight of Evidence/ Cancer Guideline	Ora	al CSF
Concern	Value	Units	for Dermal <sup>(1)</sup>	Value	Units	Description	Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds								
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	9/21/2012
Tetrachloroethene	2.1E-03	(mg/kg/day) <sup>-1</sup>	1	2.1E-03	(mg/kg/day) <sup>-1</sup>	Likely to be carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - non-mutagen (3,4)	3.7E-02	(mg/kg/day) <sup>-1</sup>	1	3.7E-02	(mg/kg/day) <sup>-1</sup>	Carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - mutagen <sup>(3,4)</sup>	9.3E-03	(mg/kg/day) <sup>-1</sup>	1	9.3E-03	(mg/kg/day) <sup>-1</sup>	Carcinogenic to humans	IRIS	9/21/2012
Vinyl Chloride <sup>(3)</sup>	7.2E-01	(mg/kg/day) <sup>-1</sup>	1	7.2E-01	(mg/kg/day) <sup>-1</sup>	A / Known human carcinogen	IRIS	9/21/2012
Semivolatile Organic Compounds								
Benzo(a)anthracene(3)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1	7.3E-01	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	USEPA(1)	7/1993
Benzo(a)pyrene <sup>(3)</sup>	7.3E+00	(mg/kg/day) <sup>-1</sup>	1	7.3E+00	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	IRIS	9/21/2012
Benzo(b)fluoranthene(3)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1	7.3E-01	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	USEPA(1)	7/1993
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	9/21/2012
Benzo(k)fluoranthene(3)	7.3E-02	(mg/kg/day) <sup>-1</sup>	1	7.3E-02	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	USEPA(1)	7/1993
Chrysene <sup>(3)</sup>	7.3E-03	(mg/kg/day) <sup>-1</sup>	1	7.3E-03	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	USEPA(1)	7/1993
Dibenzo(a,h)anthracene(3)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1	7.3E+00	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	USEPA(1)	7/1993
Indeno(1,2,3-cd)pyrene <sup>(3)</sup>	7.3E-01	(mg/kg/day) <sup>-1</sup>	1	7.3E-01	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	USEPA(1)	7/1993
Pesticides/PCBs								
Total Aroclors	2.0E+00	(mg/kg/day) <sup>-1</sup>	1	2.0E+00	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	IRIS	9/21/2012
Inorganics								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	(mg/kg/day) <sup>-1</sup>	1	1.5E+00	(mg/kg/day) <sup>-1</sup>	A / Known human carcinogen	IRIS	9/21/2012
Beryllium	NA	NA	NA	NA	NA	Carcinogenic potential cannot be determined	IRIS	9/21/2012
Cadmium	NA	NA	NA	NA	NA	B1 / Probable human carcinogen	IRIS	9/21/2012
Chromium <sup>(3,5)</sup>	5.0E-01	(mg/kg/day) <sup>-1</sup>	0.025	2.0E+01	(mg/kg/day) <sup>-1</sup>	D (Not classifiable as to human carcinogenicity)	NJDEP	4/8/2009
Cobalt	NA	NA	NA	NA	NA	NA NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	9/21/2012
Manganese	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	9/21/2012

#### CANCER TOXICITY DATA -- ORAL/DERMAL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

#### Notes:

- 1 USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
- 2 Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral absorption efficiency for dermal.
- 3 Trichloroethene, vinyl chloride, carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).
- 4 See text for a discussion of trichloroethene toxicity.
- 5 Values are for hexavalent chromium.

IRIS = Integrated Risk Information System.

NA = Not Available.

Cal EPA = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

NJDEP = New Jersey Department of Environmental Protection.

USEPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

## TABLE 5-39 CANCER TOXICITY DATA -- INHALATION FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Chemical of Potential	Unit	Risk		on Cancer Factor <sup>(1)</sup>	Weight of Evidence/ Cancer Guideline	Unit Risk :	Inhalation CSF
Concern	Value	Units	Value	Units	Description	Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds							
cis-1,2-Dichloroethene	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	9/21/2012
Tetrachloroethene	2.6E-07	(ug/m <sup>3</sup> ) <sup>-1</sup>	9.1E-04	(mg/kg/day) <sup>-1</sup>	Likely to be carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - non-mutagen <sup>(2,3)</sup>	3.1E-06	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.1E-02	(mg/kg/day) <sup>-1</sup>	Carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - mutagen (2,3)	1.0E-06	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.5E-03	(mg/kg/day) <sup>-1</sup>	Carcinogenic to humans	IRIS	9/21/2012
Vinyl Chloride	4.4E-06	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.5E-02	(mg/kg/day) <sup>-1</sup>	A / Known human carcinogen	IRIS	9/21/2012
Semivolatile Organic Compounds							
Benzo(a)anthracene(2)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-01	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Benzo(a)pyrene <sup>(2)</sup>	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E+00	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Benzo(b)fluoranthene <sup>(2)</sup>	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-01	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Benzo(g,h,i)perylene	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	9/21/2012
Benzo(k)fluoranthene(2)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-01	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Chrysene <sup>(2)</sup>	1.1E-05	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-02	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Dibenzo(a,h)anthracene(2)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	4.2E+00	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Indeno(1,2,3-cd)pyrene <sup>(2)</sup>	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-01	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Pesticides/PCBs					•		
Total Aroclors	1.0E-04	(ug/m3) <sup>-1</sup>	3.5E-01	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	IRIS	9/21/2012
Inorganics							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.5E+01	(mg/kg/day) <sup>-1</sup>	A / Known human carcinogen	IRIS	9/21/2012
Beryllium	2.4E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	8.4E+00	(mg/kg/day) <sup>-1</sup>	B1 /Known/likely human carcinogen	IRIS	9/21/2012
Cadmium	1.8E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.3E+00	(mg/kg/day) <sup>-1</sup>	B1 /Known/likely human carcinogen	IRIS	9/21/2012
Chromium <sup>(2,4)</sup>	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.9E+02	(mg/kg/day) <sup>-1</sup>	A / Known human carcinogen	IRIS	9/21/2012
Cobalt	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.2E+01	(mg/kg/day) <sup>-1</sup>	NA PPRTV		8/25/2008
Iron	NA	NA	NA	NA	NA		NA
Lead	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	9/21/2012
Manganese	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	9/21/2012

## TABLE 5-39 CANCER TOXICITY DATA -- INHALATION FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

#### Notes:

- 1 Inhalation CSF = Unit Risk \* 70 kg / 20m<sup>3</sup>/day.
- 2 Trichloroethene, vinyl chloride, carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).
- 3 See text for a discussion of trichloroethene toxicity.
- 4 Values are for hexavalent chromium.

#### Definitions:

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System.

NA = Not Available.

Cal EPA = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

PPRTV = Provisional Peer Reviewed Toxicity Value.

### TABLE 5-40 SUMMARY OF CANCER RISKS AND HAZARD INDICES

### FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
	•		1		-			<u> </u>
Current Adolescent Trespassers	Surface Soil	Incidental Ingestion	9E-07				0.02	
		Dermal Contact	8E-07					
		Inhalation	8E-10				0.00001	
		Total	2E-06				0.02	
Current Adult Trespassers	Surface Soil	Incidental Ingestion	4E-07				0.01	
Ourient Adult Trespassers	odriace doil	Dermal Contact	7E-08					
		Inhalation	6E-10				0.00001	<del></del>
		Total	5E-07				0.00001	
	I	Total	3L-01				0.01	
Current Lifelong Trespassers	Surface Soil	Incidental Ingestion	1E-06				NA	
•		Dermal Contact	9E-07				NA	
		Inhalation	1E-09				NA	
		Total	2E-06				NA	
	10 ( 0 )	li er erre	05.00		T		1 000	
Current Industrial Workers	Surface Soil	Incidental Ingestion	3E-06			Chromium VI	0.06	
		Dermal Contact	8E-07 7E-09				0.0001	
		Inhalation						
		Total	4E-06			Chromium VI	0.06	
ure Adolescent Trespassers Surfac	Surface Soil	Incidental Ingestion	1E-06				0.01	
		Dermal Contact	8E-07					
		Inhalation	1E-09				0.000003	
		Total	2E-06				0.01	
	Subsurface Soil	Incidental Ingestion	7E-07				0.02	
		Dermal Contact	2E-07					
		Inhalation	8E-10				0.000006	
		Total	9E-07				0.02	
Future Adult Trespassers	Surface Soil	Incidental Ingestion	5E-07				0.01	
		Dermal Contact	7E-08					
		Inhalation	7E-10				0.000003	
		Total	6E-07				0.01	
	Subsurface Soil	Incidental Ingestion	3E-07				0.01	
		Dermal Contact	1E-08					
		Inhalation	6E-10				0.000006	
	L	Total	3E-07	-	-	-	0.01	
Future Lifelong Trespassers	Surface Soil	Incidental Ingestion	2E-06				NA	
atare and only modpaddord	24.1400 0011	Dermal Contact	9E-07				NA NA	
		Inhalation	2E-09				NA NA	
		Total	3E-06				NA NA	
	Subsurface Soil	Incidental Ingestion	1E-06				NA NA	
	22304.1400 00.1	Dermal Contact	2E-07				NA NA	
		Inhalation	1E-09				NA NA	
		Total	1E-06				NA	

### TABLE 5-40 SUMMARY OF CANCER RISKS AND HAZARD INDICES NORTH WATERFRONT

### FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
	•	•			•		•	-
Current/Future Construction Workers	Surface Soil	Incidental Ingestion	2E-07				0.05	
		Dermal Contact	2E-08					
		Inhalation	1E-06				0.04	
		Total	1E-06			Chromium VI	0.09	
	Subsurface Soil	Incidental Ingestion	1E-07				0.07	
		Dermal Contact	5E-09					
		Inhalation	1E-06				0.2	
		Total	1E-06				0.2	
	Groundwater	Incidental Ingestion	7E-09				0.008	
		Dermal Contact	6E-08				0.05	
		Inhalation	3E-09				0.0002	
		Total	7E-08				0.06	
	Total surface soil and groundwater		1E-06				0.2	
	Total subsurface soil and groundwa	ater	1E-06				0.3	
	T	T			1			
uture Industrial Workers	Surface Soil	Incidental Ingestion	3E-06			Chromium VI	0.05	
		Dermal Contact	7E-07					
		Inhalation	9E-09				0.00003	
		Total	4E-06			Chromium VI	0.05	-
	Subsurface Soil	Incidental Ingestion	2E-06			Chromium VI	0.07	
		Dermal Contact	1E-07					
		Inhalation	7E-09				0.00006	
		Total	2E-06			Chromium VI	0.07	
	Groundwater	Incidental Ingestion	7E-06			Vinyl Chloride	0.3	
		Dermal Contact	8E-08				0.004	
		Total	7E-06			Vinyl Chloride	0.3	
	Total surface soil and groundwater		1E-05				0.4	
	Total subsurface soil and groundwa	ater	9E-06				0.4	
Hypothetical Child Residents	Surface Soil	Incidental Ingestion	5E-05		Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	0.7	
		Dermal Contact	5E-06			Benzo(a)pyrene, Dibenzo(a,h)anthracene		
		Inhalation	5E-08				0.0001	
		Total	6E-05		Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	0.7	
	Subsurface Soil	Incidental Ingestion	4E-05		Chromium VI	Benzo(a)pyrene	0.9	
		Dermal Contact	1E-06					
		Inhalation	4E-08				0.0003	
		Total	4E-05		Chromium VI	Benzo(a)pyrene	0.9	
	Groundwater	Incidental Ingestion	9E-05		Vinyl Chloride	Trichloroethene, Chromium VI	2	Trichloroethene
		Dermal Contact	9E-06			Vinyl Chloride, Chromium VI	0.3	
		Inhalation	8E-06			Trichloroethene, Vinyl Chloride	3	Trichloroethene
		Total	1E-04		Vinyl Chloride	Trichloroethene, Chromium VI	5	Trichloroethene
	Total surface soil and groundwater		2E-04				6	
	Total subsurface soil and groundwa		1E-04				6	

### TABLE 5-40 SUMMARY OF CANCER RISKS AND HAZARD INDICES NORTH WATERFRONT

### FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Hypothetical Adult Residents	Surface Soil	Incidental Ingestion	8E-06			Chromium VI	0.08	
		Dermal Contact	1E-06					
		Inhalation	6E-08				0.0001	
		Total	9E-06			Benzo(a)pyrene, Chromium VI	0.08	
	Subsurface Soil	Incidental Ingestion	5E-06			Chromium VI	0.09	
		Dermal Contact	2E-07					
		Inhalation	5E-08				0.0003	
		Total	5E-06			Chromium VI	0.09	
	Groundwater	Incidental Ingestion	2E-05			Trichloroethene, Vinyl Chloride, Chromium VI	0.8	
		Dermal Contact	3E-06			Chromium VI	0.1	
		Inhalation	1E-05			Trichloroethene	3	Trichloroethene
		Total	3E-05			Trichloroethene, Vinyl Chloride, Chromium VI	4	Trichloroethene
	Total surface soil and groundwater		4E-05		•		4	
	Total subsurface soil and groundwater						4	
Hypothetical Lifelong Residents	Surface Soil	Incidental Ingestion	6E-05		Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	NA	
		Dermal Contact	6E-06			Benzo(a)pyrene, Dibenzo(a,h)anthracene	NA	
		Inhalation	1E-07				NA	
		Total	7E-05			Benzo(a)pyrene,		
					Chromium VI	Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	
	Subsurface Soil	Incidental Ingestion	4E-05		Chromium VI Chromium VI		NA	
	Subsurface Soil	Dermal Contact	1E-06			Dibenzo(a,h)anthracene	NA NA	
	Subsurface Soil				Chromium VI	Dibenzo(a,h)anthracene Benzo(a)pyrene	NA	
	Subsurface Soil	Dermal Contact	1E-06	 	Chromium VI	Dibenzo(a,h)anthracene Benzo(a)pyrene 	NA NA	
	Subsurface Soil  Groundwater	Dermal Contact Inhalation	1E-06 9E-08	  	Chromium VI	Dibenzo(a,h)anthracene Benzo(a)pyrene Benzo(a)pyrene,	NA NA NA	  
		Dermal Contact Inhalation Total	1E-06 9E-08 4E-05		Chromium VI Chromium VI	Dibenzo(a,h)anthracene Benzo(a)pyrene Benzo(a)pyrene, Dibenzo(a,h)anthracene Trichloroethene,	NA NA NA	 
		Dermal Contact Inhalation Total Incidental Ingestion	1E-06 9E-08 4E-05 1E-04		Chromium VI Chromium VI Vinyl Chloride	Dibenzo(a,h)anthracene Benzo(a)pyrene Benzo(a)pyrene, Dibenzo(a,h)anthracene Trichloroethene, Chromium VI	NA NA NA NA	
		Dermal Contact Inhalation Total Incidental Ingestion Dermal Contact	1E-06 9E-08 4E-05 1E-04 1E-05		Chromium VI Chromium VI Vinyl Chloride	Dibenzo(a,h)anthracene Benzo(a)pyrene Benzo(a)pyrene, Dibenzo(a,h)anthracene Trichloroethene, Chromium VI Vinyl Chloride, Chromium VI Trichloroethene,	NA NA NA NA NA	   
		Dermal Contact Inhalation Total Incidental Ingestion Dermal Contact Inhalation Total	1E-06 9E-08 4E-05 1E-04 1E-05 2E-05		Chromium VI Chromium VI Vinyl Chloride Trichloroethene,	Dibenzo(a,h)anthracene Benzo(a)pyrene Benzo(a)pyrene, Dibenzo(a,h)anthracene Trichloroethene, Chromium VI Vinyl Chloride, Chromium VI Trichloroethene, Vinyl Chloride	NA NA NA NA NA NA	

### TABLE 5-41 SUMMARY OF CANCER RISKS AND HAZARD INDICES

### CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
		<b>'</b>	1				1	g · g · ·
Current Adolescent Trespassers	Surface Soil	Incidental Ingestion	2E-06				0.05	
·		Dermal Contact	9E-07				0.01	
		Inhalation	1E-09				0.00003	
		Total	3E-06			Arsenic	0.07	
Current Adult Trespassers	Surface Soil	Incidental Ingestion	2E-06			Arsenic	0.04	
Durrent Adult Trespassers	Surface Soil	Dermal Contact	2E-00			Alseliic	0.002	
		Inhalation	9E-10				0.0003	
		Total	3E-06			Arsenic	0.00003	
		Total	3L-00	<del>-</del>	<del></del>	Arseriic	0.04	<del></del>
Current Lifelong Trespassers	Surface Soil	Incidental Ingestion	5E-06			Arsenic	NA	
		Dermal Contact	1E-06				NA	
		Inhalation	2E-09				NA	
		Total	6E-06			Arsenic	NA	
	T				1	T		
Current Industrial Workers	Surface Soil	Incidental Ingestion	2E-05			Arsenic, Chromium VI	0.2	
		Dermal Contact	3E-06			Arsenic	0.02	
		Inhalation	1E-08				0.0003	
		Total	2E-05	-	Arsenic	Chromium VI	0.2	
Future Adolescent Trespassers	Surface Soil	Incidental Ingestion	2E-06				0.05	
	Curiace Con	Dermal Contact	1E-06				0.01	
		Inhalation	1E-09				0.00003	
		Total	4E-06			Arsenic	0.07	
	Subsurface Soil	Incidental Ingestion	2E-06				0.04	
		Dermal Contact	1E-06				0.01	
		Inhalation	1E-09				0.00001	
		Total	3E-06			Arsenic	0.05	
Future Adult Trespassers	Surface Soil	Incidental Ingestion	2E-06			Arsenic	0.04	
		Dermal Contact	3E-07				0.002	
		Inhalation	1E-09				0.00003	
		Total	3E-06			Arsenic	0.04	
	Subsurface Soil	Incidental Ingestion	2E-06				0.03	
		Dermal Contact	2E-07				0.001	
		Inhalation	7E-10				0.00001	-
		Total	2E-06			Arsenic	0.03	
Future Lifelong Trespassers	Surface Soil	Incidental Ingestics	5E-06		<b></b>	Arconio	NA	
uture Lifelong Trespassers	Surface Suif	Incidental Ingestion Dermal Contact	2E-06			Arsenic	NA NA	
		Inhalation	2E-06				NA NA	
		Total	7E-06			Arsenic	NA NA	
	Subsurface Soil	Incidental Ingestion	4E-06			Arsenic	NA NA	<del></del>
	Gubauriace Soii	Dermal Contact	2E-06			Alseliic 	NA NA	
		Inhalation	2E-06				NA NA	

#### TABLE 5-41 SUMMARY OF CANCER RISKS AND HAZARD INDICES

### CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Current/Future Construction Workers	Surface Soil	Incidental Ingestion	1E-06				0.3	
		Dermal Contact	9E-08				0.01	
		Inhalation	2E-06			Chromium VI	0.9	
		Total	3E-06			Chromium VI	1	
	Subsurface Soil	Incidental Ingestion	9E-07				0.2	
		Dermal Contact	8E-08				0.009	
		Inhalation	2E-06				0.3	
		Total	3E-06			Chromium VI	0.5	
	Groundwater	Incidental Ingestion	4E-07				0.2	
		Dermal Contact	2E-07				1	
		Total	7E-07				2	Target Organs HI < 1
	Total surface soil and groundwa	ater	4E-06				3	
	Total subsurface soil and groun	dwater	4E-06				2	
Future Industrial Workers	Surface Soil	Incidental Ingestion	2E-05			Arsenic, Chromium VI	0.1	
ataro madoriai Tromoro	Cuuss Cs	Dermal Contact	3E-06			Arsenic	0.02	
		Inhalation	1E-08				0.0002	
		Total	2E-05			Arsenic, Chromium VI	0.2	
	Subsurface Soil	Incidental Ingestion	1E-05			Arsenic, Chromium VI	0.1	
	Cabbanase Con	Dermal Contact	3E-06			Arsenic	0.01	
		Inhalation	1E-08				0.00008	
		Total	2E-05			Arsenic, Chromium VI	0.1	
	Groundwater	Incidental Ingestion	4E-04	Arsenic			7	Arsenic, Manganese
	Groundwater	Dermal Contact	2E-07				0.04	
		Total	4E-04	Arsenic			7	Arsenic, Manganese
	Total surface soil and groundwa		4E-04	711001110	L	· L	7	7 (150) Iviangariose
	Total subsurface soil and groundwater		4E-04				7	1
	Total Subsurface Son and groun	awatoi	46-04					ı
Hypothetical Child Residents	Surface Soil	Incidental Ingestion	1E-04		Arsenic, Chromium VI	Benzo(a)pyrene	3	Target Organs HI < 1
		Dermal Contact	6E-06			Benzo(a)pyrene, Arsenic	0.08	
		Inhalation	6E-08				0.001	
						Benzo(a)anthracene,		
		Total	1E-04		Arsenic, Chromium VI	Benzo(a)pyrene,	3	Target Organs HI < 1
					·	Benzo(b)fluoranthene		
	Subsurface Soil	Incidental Ingestion	8E-05		Arsenic, Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	2	Target Organs HI < 1
		Dermal Contact	7E-06			Benzo(a)pyrene, Arsenic	0.07	
		Inhalation	5E-08				0.0005	
		Total	9E-05		Arsenic, Chromium VI	Benzo(a)anthracene, Benzo(a)pyrene, Dibenzo(a,h)anthracene	2	Target Organs HI < 1
	Groundwater	Incidental Ingestion	6E-04	Arsenic			52	Manganese, Arsenic, Iron, Cobalt
	O. Gariawater	Dermal Contact	4E-06	Alsenic		Arsenic	4	Manganese
		Total	6E-04	Arsenic		Alsellic 	56	Manganese, Arsenic, Iron, Cobalt
				Alsenie				manganese, Arsenie, non, Cobalt
	Total surface soil and groundwa	ater	7E-04				59	

#### TABLE 5-41 SUMMARY OF CANCER RISKS AND HAZARD INDICES

### CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Hypothetical Adult Residents	Surface Soil	Incidental Ingestion	3E-05		Arsenic	Chromium VI	0.3	T
nypoinetical Addit Residents	Surface Soil	Dermal Contact	3E-06		Alsenic	Arsenic	0.01	
		Inhalation	9E-08			Argeriie	0.001	
		Total	3E-05		Arsenic	Chromium VI	0.3	
	Subsurface Soil	Incidental Ingestion	2E-05			Arsenic, Chromium VI	0.2	
		Dermal Contact	3E-06			Arsenic	0.01	
		Inhalation	7E-08				0.0005	
		Total	2E-05			Benzo(a)pyrene, Arsenic, Chromium VI	0.2	
	Groundwater	Incidental Ingestion	1E-03	Arsenic			22	Manganese, Arsenic, Iron, Cobalt
		Dermal Contact	6E-06			Arsenic	1	
		Total	1E-03	Arsenic			24	Manganese, Arsenic, Iron, Cobalt
	Total surface soil and groundwater		1E-03				24	
	Total subsurface soil and groundwater		1E-03				24	
Hypothetical Lifelong Residents	Surface Soil	Incidental Ingestion	1E-04		Arsenic, Chromium VI	Benzo(a)pyrene, Benzo(b)fluoranthene	NA	
		Dermal Contact	9E-06			Benzo(a)pyrene, Arsenic	NA	
		Inhalation	1E-07				NA	
		Total	1E-04		Arsenic, Chromium VI	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene	NA	
	Subsurface Soil	Incidental Ingestion	1E-04		Arsenic, Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	NA	
		Dermal Contact	1E-05			Benzo(a)pyrene, Arsenic	NA	
		Inhalation	1E-07				NA	
		Total	1E-04		Arsenic, Chromium VI	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	
	Groundwater	Incidental Ingestion	2E-03	Arsenic			NA	
		Dermal Contact	1E-05			Arsenic	NA	
		Total	2E-03	Arsenic			NA	
	Total surface soil and groundwater		2E-03				NA	
	Total subsurface soil and groundwa	iter	2E-03				NA	]

#### TABLE 5-42 SUMMARY OF CANCER RISKS AND HAZARD INDICES

### FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
	In 1	Transaction of			1	T		
Current Adolescent Trespassers	Surface Soil	Incidental Ingestion	6E-06			Chromium VI	0.07	
		Dermal Contact	2E-06				0.01	
		Inhalation	6E-09				0.00003	
		Total	8E-06			Arsenic, Chromium VI	0.08	
Current Adult Trespassers	Surface Soil	Incidental Ingestion	4E-06			Chromium VI	0.05	
ourient Addit Trespassers	Curiace Con	Dermal Contact	3E-07				0.002	
		Inhalation	4E-09				0.00003	
		Total	4E-06			Arsenic, Chromium VI	0.05	
	L	Total	4E 00		<u> </u>	7tiocino, Cinomiani VI	0.00	
urrent Lifelong Trespassers	Surface Soil	Incidental Ingestion	1E-05			Arsenic, Chromium VI	NA	
3		Dermal Contact	2E-06				NA	
		Inhalation	1E-08				NA	
		Total	1E-05			Arsenic, Chromium VI	NA	
					•			
Current Industrial Workers	Surface Soil	Incidental Ingestion	3E-05			Arsenic, Chromium VI	0.2	
		Dermal Contact	3E-06			Arsenic	0.01	
		Inhalation	5E-08				0.0003	
		Total	3E-05			Arsenic, Chromium VI	0.2	
		T.						
Future Adolescent Trespassers	Surface Soil	Incidental Ingestion	6E-06			Chromium VI	0.06	
		Dermal Contact	2E-06				0.01	
		Inhalation	7E-09				0.00003	
	0.1(	Total	8E-06			Arsenic, Chromium VI	0.07	
	Subsurface Soil	Incidental Ingestion	3E-06				0.06	
		Dermal Contact	1E-06				0.01	
		Inhalation	2E-09				0.00004	
		Total	4E-06			Arsenic	0.07	
uture Adult Trespassers	Curtosa Cail	Incidental Ingestion	4E-06		T	Chromium VI	0.04	
uture Adult Trespassers	Surface Soil	Incidental Ingestion	4E-06 2E-07	-		Chromium VI	0.002	-
		Dermal Contact Inhalation	5E-07	-			0.002	
		Total	4E-06				0.00003	
	Subsurface Soil	Incidental Ingestion	3E-06	<del></del>		Chromium VI	0.05	
	Subsurface Soil	Dermal Contact	2E-07			Arsenic	0.002	
		Inhalation	1E-09	<del>-</del>			0.002	
		Total	3E-06			Arsenic	0.0004	
		Total	3E-00			Arsenic	0.04	
uture Lifelong Trespassers	Surface Soil	Incidental Ingestion	1E-05			Arsenic, Chromium VI	NA	
didic Eliciony Trespassers		Dermal Contact	2E-06				NA NA	
		Inhalation	1E-08				NA NA	
		Total	1E-05			Arsenic, Chromium VI	NA NA	
	Subsurface Soil	Incidental Ingestion	5E-06			Arsenic, Chromium VI	NA NA	
		Dermal Contact	1E-06				NA NA	
		Inhalation	3E-09				NA NA	
		Total	7E-06			Arsenic, Chromium VI	NA NA	

#### TABLE 5-42 SUMMARY OF CANCER RISKS AND HAZARD INDICES

#### FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Current/Future Construction Workers	Surface Soil	Incidental Ingestion	2E-06				0.3	
		Dermal Contact	8E-08				0.01	
		Inhalation	1E-05			Chromium VI	1	
		Total	1E-05			Chromium VI	1	
	Subsurface Soil	Incidental Ingestion	1E-06			-	0.3	
		Dermal Contact	8E-08				0.01	
		Inhalation	3E-06			Chromium VI	2	Target Organs HI < 1
		Total	4E-06			Chromium VI	2	Target Organs HI < 1
	Groundwater	Incidental Ingestion	9E-09				0.009	
		Dermal Contact	1E-08				0.09	
		Inhalation	1E-09				0.00005	
		Total	2E-08				0.1	
	Total surface soil and groundwat	er	1E-05		•		1	
	Total subsurface soil and ground		4E-06				2	
uture Industrial Workers	Surface Soil	Incidental Ingestion	3E-05		Chromium VI	Arsenic	0.2	
		Dermal Contact	3E-06			Arsenic	0.01	
		Inhalation	6E-08				0.0003	
		Total	3E-05		Chromium VI	Arsenic	0.2	
	Subsurface Soil	Incidental Ingestion	2E-05			Arsenic, Chromium VI	0.2	
	Cascanace Con	Dermal Contact	3E-06			Arsenic	0.02	
		Inhalation	2E-08				0.0004	
		Total	2E-05			Arsenic, Chromium VI	0.2	
	Groundwater	Incidental Ingestion	8E-06			Arsenic	0.5	
	Groundwater	Dermal Contact	2E-08	-		711361110	0.004	-
		Total	8E-06			Arsenic	0.50	
	Total surface soil and groundwar		4E-05	<del>-</del>		Arsenic	0.7	
	Total subsurface soil and ground		3E-05				0.7	
	Total subsurface soil and ground	iwalei	3E-03				0.7	
	1					Benzo(a)pyrene,	Г Т	
lypothetical Child Residents	Surface Soil	Incidental Ingestion	3E-04	Chromium VI	Arsenic	Benzo(b)fluoranthene,	3	Target Organs HI < 1
Typothetical Child Residents	Surface Soil	incidental ingestion	3E-04	Chiomium vi	Arsenic	Dibenzo(a,h)anthracene	3	raiget Organs Hi < 1
		Darmal Cantagt	9E-06				0.08	
		Dermal Contact	3E-06			Benzo(a)pyrene, Arsenic	0.08	
		Inhalation	3E-07	<del></del>		D(-)	0.001	
		Tatal	25.04	Ob \ //	D(-)	Benzo(a)anthracene,		Tarret Carres III 4
		Total	3E-04	Chromium VI	Benzo(a)pyrene, Arsenic	Benzo(b)fluoranthene,	3	Target Organs HI < 1
	2		15.01			Dibenzo(a,h)anthracene		
	Subsurface Soil	Incidental Ingestion	1E-04		Arsenic, Chromium VI	Benzo(a)pyrene	3	Target Organs HI < 1
		Dermal Contact	4E-06			Arsenic	0.08	
		Inhalation	9E-08			<del></del>	0.002	<del>-</del>
		Total	1E-04		Arsenic, Chromium VI	Benzo(a)pyrene	3	Target Organs HI < 1
	Groundwater	Incidental Ingestion	3E-05			Vinyl Chloride, Arsenic	3	Target Organs HI < 1
		Dermal Contact	1E-06				0.4	
		Inhalation	2E-06				0.9	
		Total	3E-05		Vinyl Chloride	Trichloroethene, Arsenic	4	Manganese
	Total surface soil and groundwat	er	3E-04	<del></del>			7	<del></del>
	Total subsurface soil and ground		1E-04				7	

#### TABLE 5-42 SUMMARY OF CANCER RISKS AND HAZARD INDICES

#### FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
		,						
ypothetical Adult Residents	Surface Soil	Incidental Ingestion	5E-05		Chromium VI	Benzo(a)pyrene, Arsenic	0.3	
		Dermal Contact	3E-06				0.01	
		Inhalation	4E-07				0.001	
Subsurface Soil		Total	6E-05		Chromium VI	Benzo(a)pyrene, Arsenic	0.3	
	Subsurface Soil	Incidental Ingestion	3E-05		Arsenic	Chromium VI	0.3	
		Dermal Contact	2E-06			Arsenic	0.01	
		Inhalation	1E-07				0.002	
Groundwater		Total	3E-05		Arsenic	Chromium VI	0.3	
	Groundwater	Incidental Ingestion	2E-05		Arsenic	Vinyl Chloride	1	
	Dermal Contact	5E-07				0.1		
		Inhalation	3E-06			Trichloroethene	0.9	
	Total	3E-05		Arsenic	Trichloroethene, Vinyl Chloride	2	Target Organ HI < 1	
	Total surface soil and groundwater		9E-05		-		2	
	Total subsurface soil and groundwa	iter	6E-05				2	
ypothetical Lifelong Residents	Surface Soil	Incidental Ingestion	4E-04	Chromium VI	Arsenic	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a.h)anthracene	NA	
		Dermal Contact	1E-05			Benzo(a)pyrene, Arsenic	NA	
		Inhalation	7E-07					
							NA	
		minaidaon	7 L-07	<del>-</del>	-		NA	
		Total	4E-04	Chromium VI	Benzo(a)pyrene, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA NA	
	Subsurface Soil					Benzo(a)anthracene, Benzo(b)fluoranthene,		
	Subsurface Soil	Total	4E-04	Chromium VI	Benzo(a)pyrene, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	
	Subsurface Soil	Total Incidental Ingestion	4E-04 1E-04	Chromium VI	Benzo(a)pyrene, Arsenic  Arsenic, Chromium VI	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene Benzo(a)pyrene	NA NA	
	Subsurface Soil	Total Incidental Ingestion Dermal Contact	4E-04 1E-04 6E-06	Chromium VI  	Benzo(a)pyrene, Arsenic  Arsenic, Chromium VI	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene Benzo(a)pyrene Arsenic	NA NA NA	  
	Subsurface Soil  Groundwater	Total Incidental Ingestion Dermal Contact Inhalation	4E-04 1E-04 6E-06 2E-07	Chromium VI	Benzo(a)pyrene, Arsenic  Arsenic, Chromium VI	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene Benzo(a)pyrene Arsenic	NA NA NA	  
		Total Incidental Ingestion Dermal Contact Inhalation Total	4E-04 1E-04 6E-06 2E-07 1E-04	Chromium VI	Benzo(a)pyrene, Arsenic  Arsenic, Chromium VI    Arsenic, Chromium VI	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene Benzo(a)pyrene Arsenic Benzo(a)pyrene	NA NA NA NA	   
		Total Incidental Ingestion Dermal Contact Inhalation Total Incidental Ingestion Dermal Contact	4E-04 1E-04 6E-06 2E-07 1E-04 5E-05	Chromium VI	Benzo(a)pyrene, Arsenic  Arsenic, Chromium VI    Arsenic, Chromium VI  Vinyl Chloride, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene Benzo(a)pyrene Arsenic Benzo(a)pyrene Trichloroethene	NA NA NA NA NA NA NA	   
		Total Incidental Ingestion Dermal Contact Inhalation Total Incidental Ingestion	4E-04 1E-04 6E-06 2E-07 1E-04 5E-05 2E-06	Chromium VI	Benzo(a)pyrene, Arsenic  Arsenic, Chromium VI    Arsenic, Chromium VI  Vinyl Chloride, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene Benzo(a)pyrene Arsenic Benzo(a)pyrene Trichloroethene	NA NA NA NA NA NA NA NA NA	    
		Total Incidental Ingestion Dermal Contact Inhalation Total Incidental Ingestion Dermal Contact Inhalation	4E-04 1E-04 6E-06 2E-07 1E-04 5E-05 2E-06 5E-06	Chromium VI	Benzo(a)pyrene, Arsenic  Arsenic, Chromium VI    Arsenic, Chromium VI  Vinyl Chloride, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene Benzo(a)pyrene Arsenic Benzo(a)pyrene Trichloroethene Trichloroethene	NA	     

#### TABLE 5-43 SUMMARY OF CANCER RISKS AND HAZARD INDICES

#### SOUTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Future Adolescent Trespassers	Subsurface Soil	Incidental Ingestion	2E-06				0.06	
atare Adolescent Trespassers	Gussaniass Son	Dermal Contact	9E-07				0.01	
		Inhalation	1E-09				0.00002	
		Total	3E-06			Arsenic	0.08	
					•			
uture Adult Trespassers	Subsurface Soil	Incidental Ingestion	2E-06			Arsenic	0.05	
·		Dermal Contact	2E-07				0.002	
		Inhalation	1E-09				0.00002	
		Total	3E-06			Arsenic	0.05	
	•	•			•			
uture Lifelong Trespassers	Subsurface Soil	Incidental Ingestion	5E-06			Arsenic, Chromium VI	NA	
		Dermal Contact	1E-06				NA	
		Inhalation	3E-09				NA	
		Total	6E-06			Arsenic, Chromium VI	NA	
Current/Future Construction Workers	Subsurface Soil	Incidental Ingestion	1E-06				0.3	
		Dermal Contact	8E-08				0.01	
		Inhalation	2E-06			Chromium VI	0.5	
		Total	3E-06			Chromium VI	0.8	
uture Industrial Workers	Subsurface Soil	Incidental Ingestion	2E-05	-		Arsenic, Chromium VI	0.2	
		Dermal Contact	2E-06	<u></u>		Arsenic	0.02	
		Inhalation	1E-08				0.0002	
		Total	2E-05			Arsenic, Chromium VI	0.3	
					T	T		
uture Child Residents	Subsurface Soil	Incidental Ingestion	9E-05		Arsenic, Chromium VI		3	Target Organs HI < 1
		Dermal Contact	3E-06			Arsenic	0.08	
		Inhalation	7E-08				0.0008	
		Total	1E-04		Arsenic, Chromium VI		3	Target Organs HI < 1
	10.1. ( 0.11	1			· · · · · · · · · · · · · · · · · · ·			
uture Adult Residents	Subsurface Soil	Incidental Ingestion	2E-05	-	Arsenic	Chromium VI	0.3	
		Dermal Contact	2E-06			Arsenic	0.01	
		Inhalation	1E-07	-	 A == = = :=	Character M	0.0008	
	_1	Total	3E-05	-	Arsenic	Chromium VI	0.3	-
uture Lifelong Residents	Subsurface Soil	Incidental Ingestics	1E-04		Arsenic, Chromium VI		I NA I	
dure Lifelong Residents	Substitiace Still	Incidental Ingestion		-	'	Arania	NA NA	-
		Dermal Contact Inhalation	5E-06 2E-07			Arsenic	NA NA	
	l	Total	1E-04		Arsenic, Chromium VI		NA	

#### TABLE 5-44 SUMMARY OF CANCER RISKS AND HAZARD INDICES

#### PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks	Chemicals with Cancer Risks	Chemicals with Cancer Risks	Hazard Index	Chemicals Contributing to an
				> 10 <sup>-4</sup>	> 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	> 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>		Target Organ HI > 1
		li er eri e	1 45 00 1		1	1	1 000	
urrent Adolescent Trespassers	Surface Soil	Incidental Ingestion	1E-06				0.06	
		Dermal Contact	1E-06				0.01 0.00004	
		Inhalation Total	8E-11 3E-06	 		Arsenic	0.00004	 
		I otal	3E-06			Arsenic	0.07	
Current Adult Trespassers	Surface Soil	Incidental Ingestion	2E-06			Arsenic	0.04	
		Dermal Contact	2E-07				0.002	
		Inhalation	2E-10				0.00004	
		Total	2E-06			Arsenic	0.04	
		li er eri e	I 05 00 I		1		1 110 1	
Current Lifelong Trespassers	Surface Soil	Incidental Ingestion	3E-06			Arsenic	NA	
		Dermal Contact	1E-06				NA	
		Inhalation	3E-10				NA	
		Total	5E-06			Arsenic	NA	
Current Industrial Workers	Surface Soil	Incidental Ingestion	1E-05			Arsenic	0.2	
	34400 00	Dermal Contact	3E-06			Arsenic	0.01	
		Inhalation	2E-09			Alseliic 	0.0004	
		Total	1E-05			Arsenic	0.2	-
		Total	.2 00			7 H 001 H 0	0.2	
uture Adolescent Trespassers	Surface Soil	Incidental Ingestion	7E-06			Benzo(a)pyrene	0.06	
		_				Benzo(a)pyrene,		
		Dermal Contact	2E-05			Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	0.01	
		Inhalation	9E-11				0.00004	
						Benzo(a)anthracene,		
		Total	3E-05		Benzo(a)pyrene	Benzo(b)fluoranthene, Dibenzo(a,h)anthracene,	0.07	
	Subsurface Soil	Incidental Ingestion	3E-06			Arsenic Arsenic	0.08	
	Subsurface Soil	Dermal Contact	2E-06			Alselic	0.02	
		Inhalation	1E-09				0.00005	
		Total	5E-06			Arsenic	0.00003	
		Total	3L-00			Algeriie	0.1	
uture Adult Trespassers	Surface Soil	Incidental Ingestion	5E-06			Benzo(a)pyrene, Arsenic	0.04	-
·		Dermal Contact	2E-06				0.002	
		Inhalation	2E-10				0.00004	
		Total	6E-06			Benzo(a)pyrene, Arsenic	0.04	
	Subsurface Soil	Incidental Ingestion	3E-06			Arsenic	0.05	
		Dermal Contact	4E-07				0.003	-
		Inhalation	1E-09				0.00005	
		Total	4E-06			Arsenic	0.06	
		li i i i i i i	1 .= .= 1		1	1	1	
uture Lifelong Trespassers	Surface Soil	Incidental Ingestion	1E-05			Benzo(a)pyrene, Arsenic	NA	
		Dermal Contact	2E-05			Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	
		Inhalation	3E-10				NA	
		minalation	JE-10			Benzo(a)anthracene,	14/3	
		Total	3E-05		Benzo(a)pyrene	Benzo(b)fluoranthene, Dibenzo(a,h)anthracene,	NA	
	Subsurface Soil	Incidental Ingestion	7E-06			Arsenic Arsenic, Chromium VI	NA	
	Subsurface Sulf	Dermal Contact	2E-06			Arsenic, Chromium VI	NA NA	
		Inhalation	3E-09			AISEIIIC	NA NA	<u>-</u>
		Total	9E-06			Arsenic, Chromium VI	NA NA	
		i otai	JE-00			Alberio, Officialium VI	11/	

#### TABLE 5-44 SUMMARY OF CANCER RISKS AND HAZARD INDICES

#### PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
0 1/5 1 0 1 1 1 1 1	Io ( o :	h er en e	05.00		I			
Current/Future Construction Workers	Surface Soil	Incidental Ingestion	2E-06				0.2	
		Dermal Contact	5E-07				0.01	
		Inhalation	3E-07				1	
	Out-out-out-out	Total	2E-06				1	
	Subsurface Soil	Incidental Ingestion	1E-06				0.4	
		Dermal Contact	1E-07				0.02	
		Inhalation	2E-06			Chromium VI	2	Target Organs HI < 1
		Total	3E-06			Chromium VI	2	Target Organs HI < 1
- uture Industrial Workers	Surface Soil	Incidental Ingestion	3E-05			Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	0.2	
		Dermal Contact	2E-05			Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	0.01	
		Inhalation	2E-09				0.0004	
Subsurface		Total	5E-05		Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	0.2	
	Subsurface Soil	Incidental Ingestion	2E-05		Arsenic	Chromium VI	0.3	
		Dermal Contact	4E-06			Arsenic	0.02	
		Inhalation	1E-08				0.0005	
		Total	3E-05		Arsenic	Chromium VI	0.3	
Hypothetical Child Residents	Surface Soil	Incidental Ingestion	3E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	Indeno(1,2,3-cd)pyrene	3	Target Organs HI < 1
		Dermal Contact	1E-04		Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Arsenic	0.08	
		Inhalation	3E-09				0.002	
		Total	5E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	Indeno(1,2,3-cd)pyrene	3	Target Organs HI < 1
	Subsurface Soil	Incidental Ingestion	1E-04		Arsenic, Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	4	Target Organs HI < 1
		Dermal Contact	9E-06			Benzo(a)pyrene, Arsenic	0.1	
		Inhalation	7E-08				0.002	
		Total	1E-04		Arsenic, Chromium VI	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	4	Arsenic

#### TABLE 5-44 SUMMARY OF CANCER RISKS AND HAZARD INDICES

#### PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup>	Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup>	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Hypothetical Adult Residents Surface Soil	Surface Soil	Incidental Ingestion	6E-05		Benzo(a)pyrene, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	0.3	
		Dermal Contact	3E-05		Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	0.01	
		Inhalation	9E-09				0.002	
		Total	9E-05		Benzo(a)pyrene, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene	0.3	
Subsurface Soil	Incidental Ingestion	3E-05		Arsenic	Chromium VI	0.4	-	
		Dermal Contact	4E-06			Arsenic	0.02	-
		Inhalation	1E-07				0.002	
		Total	4E-05		Arsenic	Benzo(a)pyrene, Chromium VI	0.4	
Hypothetical Lifelong Residents	Surface Soil	Incidental Ingestion	4E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	Indeno(1,2,3-cd)pyrene	NA	
		Dermal Contact	1E-04		Benzo(a)pyrene, Dibenzo(a,h)anthracene	Benzo(a)anthracene, Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, Arsenic	NA	
		Inhalation	1E-08				NA	-
Subsurface Soil		Total	5E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene, Total Aroclors	NA	
	Subsurface Soil	Incidental Ingestion	2E-04		Arsenic, Chromium VI	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	
		Dermal Contact	1E-05			Benzo(a)pyrene, Arsenic	NA	
		Inhalation	2E-07				NA	
		Total	2E-04		Arsenic, Chromium VI	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	

# TABLE 5-45 SCREENING RISK EVALUATION FOR VAPOR INTRUSION VISL CALCULATOR - NORTH WATERFRONT GROUNDWATER FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

		Calavilatad	Resi	idential	Industrial	
COPC	Maximum Groundwater Concentration (ug/L)	Calculated Indoor Air Concentration (ug/m³)	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
cis-1,2-Dichloroethene	4.26	0.57	No IUR	No RfC	No IUR	No RfC
trans-1,2-Dichloroethene	4.81	0.65	No IUR	1.0E-02	No IUR	2.50E-03
Tetrachloroethene	0.696	0.38	4.1E-08	9.2E-03	8.1E-09	2.20E-03
Trichloroethene	33	10.4	2.4E-05	5.0E+00	3.5E-06	1.2
Vinyl Chloride	1.47	1.45	9.0E-06	1.4E-02	5.2E-07	3.30E-03
		TOTAL	3.E-05	5	4.E-06	1

Bolded cell indicates that COPC was identified as a COPC in groundwater for vapor intrusion (Table 5-9).

**COPC** - Contaminant of Potential Concern

IUR - Inhalation Unit Risk

RfC - Reference Concentration

# TABLE 5-46 SCREENING RISK EVALUATION FOR VAPOR INTRUSION VISL CALCULATOR - NORTH WATERFRONT SOIL GAS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

	Ma 144 44 04 1	0-1-1-1-1	Resi	idential	Indus	strial
COPC	Maximum Soil Gas Concentration (ug/m³)	Calculated Indoor Air Concentration (ug/m³)	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
Acrylonitrile*	2.8	0.28	7.8E-06	1.3E-01	1.6E-06	3.2E-02
Benzene*	6.8	0.68	2.1E-07	2.1E-03	4.3E-08	5.1E-04
1,3-Butadiene*	13	1.3	1.6E-05	6.2E-01	3.2E-06	1.5E-01
1,1-Dichloroethane*	0.25	0.025	1.6E-08	No RfC	3.3E-09	No RfC
cis-1,2-Dichloroethene	27	2.7	No IUR	No RfC	No IUR	No RfC
trans-1,2-Dichloroethene	4.1	0.41	No IUR	6.6E-03	No IUR	1.6E-03
Tetrachloroethene	12	1.2	1.3E-07	2.9E-02	2.5E-08	6.8E-03
1,1,1-Trichloroethane*	0.26	0.026	No IUR	5.0E-06	No IUR	1.2E-06
Trichloroethene	120	12	2.8E-05	5.8E+00	4.0E-06	1.4E+00
Vinyl Chloride	0.76	0.076	4.7E-07	7.3E-04	2.7E-08	1.7E-04
		TOTAL	5.E-05	7	9.E-06	2
	TOTAL OF CHLORINATED H	YDROCARBONS	3.E-05	6	4.E-06	1

Bolded cell indicates that COPC was identified as a COPC in groundwater for vapor intrusion (Table 5-10).

\*COPC was not detected in groundwater samples collected from North Waterfront.

**COPC** - Contaminant of Potential Concern

IUR - Inhalation Unit Risk

RfC - Reference Concentration

# TABLE 5-47 SCREENING RISK EVALUATION FOR VAPOR INTRUSION VISL CALCULATOR - FORMER BUILDING 234 GROUNDWATER FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

			Resi	idential	Industrial	
COPC	Maximum Groundwater Concentration (ug/L)		Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
1,1-Dichloroethene	0.25	0.22	No IUR	1.1E-03	No IUR	2.50E-04
cis-1,2-Dichloroethene	12.7	1.70	No IUR	No RfC	No IUR	No RfC
Trichloroethene	4	1.26	2.9E-06	6.1E-01	4.2E-07	1.4E-01
Vinyl Chloride	100	98.7	6.1E-04	9.5E-01	3.5E-05	2.3E-01
		TOTAL	6.E-04	2	4.E-05	0.4

Bolded cell indicates that COPC was identified as a COPC in groundwater for vapor intrusion (Table 5-22).

**COPC** - Contaminant of Potential Concern

IUR - Inhalation Unit Risk

RfC - Reference Concentration

#### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 5

December	Reasonable Maxi	Reasonable Maximum Exposures						
Receptor	ILCR	HI						
CURRENT ADOLESCENT TRESPASSERS								
Surface Soil								
Site Risk <sup>(1)</sup>	2E-06	0.02						
Background Risk <sup>(2)</sup>	6E-07	0.01						
Site + Background Risk <sup>(3)</sup>	3E-06	0.03						

CURRENT ADULT TRESPASSERS							
Surface Soil							
Site Risk	5E-07	0.01					
Background Risk	6E-07	0.007					
Site + Background Risk 1E-06 0.02							

CURRENT LIFELONG TRESPASSERS							
Surface Soil							
Site Risk	2E-06	NA					
Background Risk	1E-06	NA					
Site + Background Risk 3E-06 NA							

CURRENT INDUSTRIAL WORKERS		
Surface Soil		
Site Risk	4E-06	0.06
Background Risk	4E-06	0.04
Site + Background Risk	8E-06	0.1

FUTURE ADOLESCENT TRESPASSERS		
Surface Soil		
Site Risk	2E-06	0.01
Background Risk	5E-07	0.01
Site + Background Risk	3E-06	0.02
Subsurface Soil		
Site Risk	8E-07	0.02
Background Risk	7E-07	0.01
Site + Background Risk	2E-06	0.03

FUTURE ADULT TRESPASSERS		
Surface Soil		
Site Risk	6E-07	0.01
Background Risk	5E-07	0.007
Site + Background Risk	1E-06	0.02
Subsurface Soil		
Site Risk	3E-07	0.01
Background Risk	6E-07	0.007
Site + Background Risk	9E-07	0.02

#### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 5

Pagantar	Reasonable Maximum Exposures	
Receptor	ILCR	HI
FUTURE LIFELONG	TRESPASSERS	
Surface Soil		
Site Risk	2E-06	NA
Background Risk	1E-06	NA
Site + Background Risk	3E-06	NA
Subsurface Soil		
Site Risk	1E-06	NA
Background Risk	1E-06	NA
Site + Background Risk	2E-06	NA

CURRENT/FUTURE CONSTRUCTION WORKERS			
Surface Soil			
Site Risk	2E-06	0.09	
Background Risk	3E-07	0.6	
Site + Background Risk	2E-06	0.7	
Subsurface Soil			
Site Risk	1E-06	0.2	
Background Risk	3E-07	0.5	
Site + Background Risk	1E-06	0.7	
Groundwater			
Site Risk	7E-08	0.06	
Background Risk	0E+00	0	
Site + Background Risk	7E-08	0.06	
Site Totals			
Total Surface Soil and Groundwater	2E-06	0.2	
Total Subsurface Soil and Groundwater	1E-06	0.3	
Site and Background Totals			
Total Surface Soil and Groundwater	2E-06	0.8	
Total Subsurface Soil and Groundwater	1E-06	0.8	

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 5

Receptor	Reasonable Maximum Exposures		
	ILCR	HI	
FUTURE INDUST	FUTURE INDUSTRIAL WORKERS		
Surface Soil			
Site Risk	4E-06	0.05	
Background Risk	4E-06	0.04	
Site + Background Risk	8E-06	0.09	
Subsurface Soil			
Site Risk	2E-06	0.07	
Background Risk	4E-06	0.04	
Site + Background Risk	6E-06	0.1	
Groundwater			
Site Risk	3E-06	0.2	
Background Risk	0E+00	0	
Site + Background Risk	3E-06	0.2	
Site Totals			
Total Surface Soil and Groundwater	7E-06	0.3	
Total Subsurface Soil and Groundwater	5E-06	0.3	
Site and Background Totals			
Total Surface Soil and Groundwater	1E-05	0.3	
Total Subsurface Soil and Groundwater	9E-06	0.3	

CHILD RESIDENTS		
Surface Soil		
Site Risk	6E-05	0.7
Background Risk	1E-05	0.5
Site + Background Risk	7E-05	1
Subsurface Soil		
Site Risk	4E-05	0.9
Background Risk	1E-05	0.5
Site + Background Risk	5E-05	1
Groundwater		
Site Risk	1E-04	5
Background Risk	0E+00	0
Site + Background Risk	1E-04	5
Site Totals		
Total Surface Soil and Groundwater	2E-04	6
Total Subsurface Soil and Groundwater	1E-04	6

#### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 OF 5

Popular	Reasonable Maximum Exposures	
Receptor	ILCR	HI
Site and Background Totals		
Total Surface Soil and Groundwater	2E-04	6
Total Subsurface Soil and Groundwater	2E-04	6
	RESIDENTS	
Surface Soil		
Site Risk	9E-06	0.08
Background Risk	5E-06	0.05
Site + Background Risk	1E-05	0.1
Subsurface Soil		
Site Risk	5E-06	0.09
Background Risk	6E-06	0.05
Site + Background Risk	1E-05	0.1
Groundwater		
Site Risk	3E-05	4
Background Risk	0E+00	0
Site + Background Risk	3E-05	4
Site Totals		
Total Surface Soil and Groundwater	4E-05	4
Total Subsurface Soil and Groundwater	4E-05	4
Site and Background Totals		
Total Surface Soil and Groundwater	4E-05	4
Total Subsurface Soil and Groundwater	4E-05	4

LIFELONG RESIDENTS		
Surface Soil		
Site Risk	7E-05	NA
Background Risk	1E-05	NA
Site + Background Risk	8E-05	NA
Subsurface Soil		
Site Risk	4E-05	NA
Background Risk	2E-05	NA
Site + Background Risk	6E-05	NA
Groundwater		
Site Risk	1E-04	NA
Background Risk	0E+00	NA
Site + Background Risk	1E-04	NA

## TABLE 5-48 RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS NORTH WATERFRONT FORMER POBERT E DERECKTOR SHIPYARD

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 5 OF 5

Popular	Reasonable Maximum Exposures	
Receptor	ILCR	HI
Site Totals		
Total Surface Soil and Groundwater	2E-04	NA
Total Subsurface Soil and Groundwater	1E-04	NA
Site and Background Totals		
Total Surface Soil and Groundwater	2E-04	NA
Total Subsurface Soil and Groundwater	2E-04	NA

#### Notes:

ILCR = Incremental Lifetime Cancer Risk

HI = Hazard Index

- 1 Cancer risk or hazard index from only site-related chemicals detected at concentrations exceeding screening levels.
- 2 Cancer risk or hazard index from only chemicals present at naturally occurring levels detected at concentrations exceeding screening levels. Aluminum, arsenic, and manganese were within background levels in surface soil. Arsenic and manganese were within background levels in subsurface soil.
- 3 Cancer risk or hazard index from all chemicals detected at concentrations exceeding screening levels.

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 5

<b>5</b> .	Reasonable Maxi	mum Exposures
Receptor	ILCR	HI
CURRENT A	DOLESCENT TRESPASSERS	
Surface Soil		
Site Risk <sup>(1)</sup>	3E-06	0.07
Background Risk <sup>(2)</sup>	0E+00	0.003
Site + Background Risk <sup>(3)</sup>	3E-06	0.07
-		
CURREN	IT ADULT TRESPASSERS	
Surface Soil		
Site Risk	3E-06	0.04
Background Risk	0E+00	0.002
Site + Background Risk	3E-06	0.04
	LIFELONG TRESPASSERS	
Surface Soil		
Site Risk	6E-06	NA NA
Background Risk	0E+00	NA NA
Site + Background Risk	6E-06	NA
CURREN	T INDUSTRIAL WORKERS	
Surface Soil	I INDUSTRIAL WORKERS	
Site Risk	2E-05	0.2
Background Risk	0E+00	0.2
Site + Background Risk	2E-05	0.01
Sile + Dackground Nisk	2L-03	0.2
FUTURE A	DOLESCENT TRESPASSERS	
Surface Soil	SOLLOOLIN INLOI AGGERG	
Site Risk	4E-06	0.07
Background Risk	0E+00	0.003
Site + Background Risk	4E-06	0.07
Cite : Daonground ruon	1 12 00	0.01
Subsurface Soil		
Site Risk	3E-06	0.05
Background Risk	0E+00	0.004
Site + Background Risk	3E-06	0.05
	E ADULT TRESPASSERS	
Surface Soil		
Site Risk	3E-06	0.04
Background Risk	0E+00	0.002
Site + Background Risk	3E-06	0.04
Subsurface Soil		
Site Risk	2E-06	0.03
Background Risk	0E+00	0.003
Site + Background Risk	2E-06	0.03

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 5

December	Reasonable Maximum Exposures		
Receptor	ILCR	HI	
FUTURE LIFELONG	G TRESPASSERS		
Surface Soil			
Site Risk	7E-06	NA	
Background Risk	0E+00	NA	
Site + Background Risk	7E-06	NA	
Subsurface Soil			
Site Risk	6E-06	NA	
Background Risk	0E+00	NA	
Site + Background Risk	6E-06	NA	

CURRENT/FUTURE CONSTRUCTION WORKERS Surface Soil		
Background Risk	0E+00	0.2
Site + Background Risk	3E-06	1
Subsurface Soil		
Site Risk	3E-06	0.5
Background Risk	0E+00	0.7
Site + Background Risk	3E-06	1
Groundwater		
Site Risk	7E-07	2 <sup>(4)</sup>
Background Risk	0E+00	0
Site + Background Risk	7E-07	2 <sup>(4)</sup>
Site Totals		
Total Surface Soil and Groundwater	4E-06	3
Total Subsurface Soil and Groundwater	4E-06	3
Site and Background Totals		
Total Surface Soil and Groundwater	4E-06	3
Total Subsurface Soil and Groundwater	4E-06	3

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
FUTURE INDUSTRIAL WORKERS		
Surface Soil		
Site Risk	2E-05	0.2
Background Risk	0E+00	0.01
Site + Background Risk	2E-05	0.2
Subsurface Soil		
Site Risk	2E-05	0.1
Background Risk	0E+00	0.02
Site + Background Risk	2E-05	0.1
Groundwater		
Site Risk	2E-04	4
Background Risk	0E+00	0
Site + Background Risk	2E-04	4
Site Totals		
Total Surface Soil and Groundwater	2E-04	4
Total Subsurface Soil and Groundwater	2E-04	4
Site and Background Totals		
Total Surface Soil and Groundwater	2E-04	4
Total Subsurface Soil and Groundwater	2E-04	4

CHILD RESIDENTS Surface Soil		
Background Risk	0E+00	0.2
Site + Background Risk	1E-04	3 <sup>(4)</sup>
Subsurface Soil		
Site Risk	9E-05	2 <sup>(4)</sup>
Background Risk	0E+00	0.2
Site + Background Risk	9E-05	2 <sup>(4)</sup>
Groundwater		
Site Risk	6E-04	56
Background Risk	0E+00	0
Site + Background Risk	6E-04	56
Site Totals		
Total Surface Soil and Groundwater	7E-04	59
Total Subsurface Soil and Groundwater	7E-04	58
Site and Background Totals		
Total Surface Soil and Groundwater	7E-04	59
Total Subsurface Soil and Groundwater	7E-04	58

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
ADULT R	RESIDENTS	
Surface Soil		
Site Risk	3E-05	0.3
Background Risk	0E+00	0.02
Site + Background Risk	3E-05	0.3
Subsurface Soil		
Site Risk	2E-05	0.2
Background Risk	0E+00	0.02
Site + Background Risk	2E-05	0.2
Groundwater		
Site Risk	1E-03	24
Background Risk	0E+00	0
Site + Background Risk	1E-03	24
Site Totals		
Total Surface Soil and Groundwater	1E-03	24
Total Subsurface Soil and Groundwater	1E-03	24
Site and Background Totals		
Total Surface Soil and Groundwater	1E-03	24
Total Subsurface Soil and Groundwater	1E-03	24

LIFELONG RESIDENTS Surface Soil		
Background Risk	0E+00	NA
Site + Background Risk	1E-04	NA
Subsurface Soil		
Site Risk	1E-04	NA
Background Risk	0E+00	NA
Site + Background Risk	1E-04	NA
Groundwater		
Site Risk	2E-03	NA
Background Risk	0E+00	NA
Site + Background Risk	2E-03	NA
Site Totals		
Total Surface Soil and Groundwater	2E-03	NA
Total Subsurface Soil and Groundwater	2E-03	NA

#### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 5 OF 5

Pagantar	Reasonable Maximum Exposures	
Receptor	ILCR	HI
Site and Background Totals		
Total Surface Soil and Groundwater	2E-03	NA
Total Subsurface Soil and Groundwater	2E-03	NA

#### Notes:

ILCR = Incremental Lifetime Cancer Risk

HI = Hazard Index

- 1 Cancer risk or hazard index from only site-related chemicals detected at concentrations exceeding screening levels.
- 2 Cancer risk or hazard index from only chemicals present at naturally occurring levels detected at concentrations exceeding screening levels. Aluminum was within background levels in surface soil. Manganese was within background levels in groundwater.
- 3 Cancer risk or hazard index from all chemicals detected at concentrations exceeding screening levels.
- 4 Hazard index for individual target organs were less than or equal to 1.

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 4

Decenter	Reasonable Maximum Exposures	
Receptor	ILCR	. HI
CURRENT AD	OLESCENT TRESPASSERS	
Surface Soil		
Site Risk <sup>(1)</sup>	8E-06	0.08
Background Risk <sup>(2)</sup>	0E+00	0.003
Site + Background Risk <sup>(3)</sup>	8E-06	0.08
CURRENT	ADULT TRESPASSERS	
Surface Soil		
Site Risk	4E-06	0.05
Background Risk	0E+00	0.002
Site + Background Risk	4E-06	0.05
	IFELONG TRESPASSERS	
Surface Soil	45.05	NIA
Site Risk	1E-05	NA NA
Background Risk	0E+00	NA NA
Site + Background Risk	1E-05	NA
CURRENT	INDUSTRIAL WORKERS	
Surface Soil	INDOOTHIAL WORKERS	
Site Risk	3E-05	0.2
Background Risk	0E+00	0.01
Site + Background Risk	3E-05	0.2
	<u> </u>	V.=
FUTURE ADO	OLESCENT TRESPASSERS	
FUTURE ADO Surface Soil	DLESCENT TRESPASSERS	
	8E-06	0.07
Surface Soil		0.07 0.003
Surface Soil Site Risk	8E-06	
Surface Soil Site Risk Background Risk Site + Background Risk	8E-06 0E+00 8E-06	0.003
Surface Soil Site Risk Background Risk Site + Background Risk FUTURE	8E-06 0E+00	0.003
Surface Soil Site Risk Background Risk Site + Background Risk  FUTURE Surface Soil	8E-06 0E+00 8E-06 ADULT TRESPASSERS	0.003 0.07
Surface Soil Site Risk Background Risk Site + Background Risk  FUTURE Surface Soil Site Risk	8E-06 0E+00 8E-06 ADULT TRESPASSERS	0.003 0.07 0.05
Surface Soil Site Risk Background Risk Site + Background Risk  FUTURE Surface Soil Site Risk Background Risk	8E-06 0E+00 8E-06 ADULT TRESPASSERS 4E-06 0E+00	0.003 0.07 0.05 0.002
Surface Soil Site Risk Background Risk Site + Background Risk  FUTURE Surface Soil Site Risk	8E-06 0E+00 8E-06 ADULT TRESPASSERS	0.003 0.07 0.05
Surface Soil Site Risk Background Risk Site + Background Risk  FUTURE Surface Soil Site Risk Background Risk Site + Background Risk	8E-06 0E+00 8E-06 ADULT TRESPASSERS 4E-06 0E+00 4E-06	0.003 0.07 0.05 0.002
Surface Soil Site Risk Background Risk Site + Background Risk  FUTURE Surface Soil Site Risk Background Risk Site + Background Risk FITURE LI	8E-06 0E+00 8E-06 ADULT TRESPASSERS 4E-06 0E+00	0.003 0.07 0.05 0.002
Surface Soil Site Risk Background Risk Site + Background Risk  FUTURE Surface Soil Site Risk Background Risk Site + Background Risk FITURE LISUITAGE Soil	8E-06 0E+00 8E-06 ADULT TRESPASSERS 4E-06 0E+00 4E-06	0.003 0.07 0.05 0.002 0.05
Surface Soil Site Risk Background Risk Site + Background Risk  FUTURE Surface Soil Site Risk Background Risk Site + Background Risk FITURE LI	8E-06 0E+00 8E-06 ADULT TRESPASSERS 4E-06 0E+00 4E-06	0.003 0.07 0.05 0.002

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 4

Pagantar	Reasonable Maximum Exposures	
Receptor	ILCR	HI
CURRENT/FUTURE C	ONSTRUCTION WORKERS	
Surface Soil		
Site Risk	1E-05	1
Background Risk	0E+00	0.2
Site + Background Risk	1E-05	1
Groundwater		
Site Risk	2E-08	0.1
Background Risk	0E+00	0
Site + Background Risk	2E-08	0.1
Site Totals		
Total Surface Soil and Groundwater	1E-05	1
Site and Background Totals Total Surface Soil and Groundwater	1E-05	1
	ISTRIAL WORKERS	'
Surface Soil	JOHN TO WOLKE	
Site Risk	3E-05	0.2
Background Risk	0E+00	0.009
Site + Background Risk	3E-05	0.2
Groundwater		
Site Risk	4E-06	0.2
Background Risk	0E+00	0
Site + Background Risk	4E-06	0.2
Site Totals		
Total Surface Soil and Groundwater	3E-05	0.4
Site and Background Totals		
Total Surface Soil and Groundwater	3E-05	0.4

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 4

Receptor	Reasonable Maxi	Reasonable Maximum Exposures	
	ILCR	HI	
CHIL	D RESIDENTS		
Surface Soil			
Site Risk	3E-04	3 <sup>(4)</sup>	
Background Risk	0E+00	0.1	
Site + Background Risk	3E-04	3 <sup>(4)</sup>	
Groundwater			
Site Risk	3E-05	4	
Background Risk	0E+00	0	
Site + Background Risk	3E-05	4	
Site Totals			
Total Surface Soil and Groundwater	3E-04	7	
Site and Background Totals			
Total Surface Soil and Groundwater	3E-04	7	

ADULT RESIDENTS		
Surface Soil		
Site Risk	6E-05	0.3
Background Risk	0E+00	0.01
Site + Background Risk	6E-05	0.3
Groundwater		
Site Risk	3E-05	2 <sup>(4)</sup>
Background Risk	0E+00	0
Site + Background Risk	3E-05	2 <sup>(4)</sup>
Site Totals		
Total Surface Soil and Groundwater	9E-05	2
Site and Background Totals		
Total Surface Soil and Groundwater	9E-05	2

#### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 OF 4

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
LIFELONG I	RESIDENTS	
Surface Soil		
Site Risk	4E-04	NA
Background Risk	0E+00	NA
Site + Background Risk	4E-04	NA
Groundwater		
Site Risk	6E-05	NA
Background Risk	0E+00	NA
Site + Background Risk	6E-05	NA
Site Totals		
Total Surface Soil and Groundwater	5E-04	NA
Site and Background Totals		
Total Surface Soil and Groundwater	5E-04	NA

#### Notes:

ILCR = Incremental Lifetime Cancer Risk

HI = Hazard Index

- 1 Cancer risk or hazard index from only site-related chemicals detected at concentrations exceeding screening levels.
- 2 Cancer risk or hazard index from only chemicals present at naturally occurring levels detected at concentrations exceeding screening levels. Aluminum was within background levels in surface soil. No chemical was detected within background levels in subsurface soil.
- 3 Cancer risk or hazard index from all chemicals detected at concentrations exceeding screening levels.
- 4 Hazard index for individual target organs were less than or equal to 1.

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Beconter	Reasonable Maximum Exposures	
Receptor	ILCR	HI
FUTURE ADOLESCENT TRESPASSERS		
Subsurface Soil		
Site Risk <sup>(1)</sup>	3E-06	0.08
Background Risk <sup>(2)</sup>	0E+00	0.008
Site + Background Risk <sup>(3)</sup>	3E-06	0.09

FUTURE ADULT TRESPASSERS		
Subsurface Soil		
Site Risk	3E-06	0.05
Background Risk	0E+00	0.005
Site + Background Risk	3E-06	0.06

FUTURE LIFELONG TRESPASSERS		
Subsurface Soil		
Site Risk	6E-06	NA
Background Risk	0E+00	NA
Site + Background Risk	6E-06	NA

CURRENT/FUTURE CONSTRUCTION WORKERS Subsurface Soil		
Background Risk	0E+00	1
Site + Background Risk	3E-06	2
FUTURE INDUSTRIAL WORKERS		
Subsurface Soil		
Site Risk	2E-05	0.3
Background Risk	0E+00	0.03
Site + Background Risk	2E-05	0.3

CHILD RESIDENTS		
Subsurface Soil		
Site Risk	1E-04	3 <sup>(4)</sup>
Background Risk	0E+00	0.4
Site + Background Risk	1E-04	3 <sup>(4)</sup>

ADULT RESIDENTS		
Subsurface Soil		
Site Risk	3E-05	0.3
Background Risk	0E+00	0.04
Site + Background Risk	3E-05	0.3

#### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Receptor	Reasonable Max	Reasonable Maximum Exposures	
	ILCR	HI	
LIFELONG RESIDENTS			
Subsurface Soil			
Site Risk	1E-04	NA	
Background Risk	0E+00	NA	
Site + Background Risk	1E-04	NA	

#### Notes:

ILCR = Incremental Lifetime Cancer Risk

HI = Hazard Index

- 1 Cancer risk or hazard index from only site-related chemicals detected at concentrations exceeding screening levels.
- 2 Cancer risk or hazard index from only chemicals present at naturally occurring levels detected at concentrations exceeding screening levels. Manganese was within background levels in subsurface soil.
- 3 Cancer risk or hazard index from all chemicals detected at concentrations exceeding screening levels.
- 4 Hazard index for individual target organs were less than or equal to 1.

### TABLE 5-52 RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS PCB REMOVAL AREA

### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

December	Reasonable Maximum Exposures	
Receptor	ILCR	HI
CURRENT A	DOLESCENT TRESPASSERS	
Surface Soil		
Site Risk <sup>(1)</sup>	3E-06	0.07
Background Risk <sup>(2)</sup>	9E-07	0.005
Site + Background Risk <sup>(3)</sup>	4E-06	0.08
	•	
CURREN	IT ADULT TRESPASSERS	
Surface Soil		
Site Risk	2E-06	0.04
Background Risk	4E-07	0.003
Site + Background Risk	2E-06	0.04
	LIFELONG TRESPASSERS	
Surface Soil		
Site Risk	5E-06	NA
Background Risk	1E-06	NA
Site + Background Risk	6E-06	NA
CIIDDEN	T INDUSTRIAL WORKERS	
Surface Soil	I INDUSTRIAL WORKERS	
Site Risk	1E-05	0.2
Background Risk	3E-06	0.02
Site + Background Risk	1E-05	0.2
J. G. F. Dalong, Galifa Filos.		<b>U.</b>
FUTURE AD	OOLESCENT TRESPASSERS	
Surface Soil		
Site Risk	3E-05	0.07
Background Risk	9E-07	0.005
Site + Background Risk	3E-05	0.08
	E ADULT TRESPASSERS	
Surface Soil	07.00	
Site Risk	6E-06	0.04
Background Risk	4E-07	0.003
Site + Background Risk	6E-06	0.04
EUTUDE I	IEELONG TRESPASSERS	
Surface Soil	LIFELONG TRESPASSERS	
Site Risk	3E-05	NA
Site Risk Background Risk	1E-06	NA NA
Background Risk Site + Background Risk	3E-05	NA NA
THE T DAURYTUUTU INISK	3E-00	INA

#### TABLE 5-52 RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS PCB REMOVAL AREA

#### FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
CURRENT/FUTURE CONSTRUCTION WORKERS		
Surface Soil		
Site Risk	2E-06	1
Background Risk	2E-06	0.2
Site + Background Risk	4E-06	1

FUTURE INDUSTRIAL WORKERS		
Surface Soil		
Site Risk	5E-05	0.2
Background Risk	3E-06	0.02
Site + Background Risk	5E-05	0.2

CHILD RESIDENTS		
Surface Soil		
Site Risk	5E-04	3 <sup>(4)</sup>
Background Risk	5E-05	0.2
Site + Background Risk	6E-04	3 <sup>(4)</sup>

ADULT RESIDENTS		
Surface Soil		
Site Risk	9E-05	0.3
Background Risk	7E-06	0.02
Site + Background Risk	1E-04	0.3

LIFELONG RESIDENTS			
Surface Soil			
Site Risk	5E-04	NA	
Background Risk	5E-05	NA	
Site + Background Risk	6E-04	NA	

#### Notes:

ILCR = Incremental Lifetime Cancer Risk

HI = Hazard Index

- 1 Cancer risk or hazard index from only site-related chemicals detected at concentrations exceeding screening levels.
- 2 Cancer risk or hazard index from only chemicals present at naturally occurring levels detected at concentrations exceeding screening levels. Aluminum and chromium were within background levels in surface soil. No chemicals were within background levels in subsurface soil.
- 3 Cancer risk or hazard index from all chemicals detected at concentrations exceeding screening levels.
- 4 Hazard index for individual target organs were less than or equal to 1.

# TABLE 5-53 CHEMICALS RETAINED AS CHEMICALS OF CONCERN NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

		Receptor										
	Current	Current Adult	Current	Current	Future	Future Adult	Future	Current/Future	Future	Hypothetical	Hypothetical	Hypothetical
Chemical	Adolescent		Lifelong	Industrial	Adolescent		Lifelong	Construction	Industrial	Child	Adult	Lifelong
	Trespassers Trespassers		Trespassers	Workers	kers Trespassers Trespassers		Trespassers	Workers	Workers	Residents	Residents	Residents
	Surface Soil											
	No COCs were identified for surface soil.											
	Subsurface Soil											
	No COCs were identified for subsurface soil.											
Groundwater												
Trichloroethene										X	X	X

X - Chemical is retained as a chemical of concern (COC).

A chemical is retained as a COC if it contributed to a total cancer risk greater than 1x10<sup>-4</sup> or to a target organ hazard index greater than 1.

# TABLE 5-54 CHEMICALS RETAINED AS CHEMICALS OF CONCERN CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

		Receptor												
	Current	Current Adult	Lifelong Industrial	Future Future	Future Adult	Future	Current/Future	Future	Hypothetical	Hypothetical	Hypothetical			
Chemical	Adolescent			Industrial	Adolescent	Trespassers	Lifelong	Construction	Industrial	Child	Adult	Lifelong		
	Trespassers	Trespassers	Trespassers	Workers	Trespassers		Trespassers	Workers	Workers	Residents	Residents	Residents		
Surface Soil														
No COCs were identified for surface soil.														
Subsurface Soil														
	No COCs were identified for subsurface soil.													
Groundwater														
Arsenic				•					X	X	X	X		
Cobalt				•					•	X	X	X		
Iron				•					•	X	X	X		
Manganese				•					X	X	X	X		

X - Chemical is retained as a chemical of concern (COC).

A chemical is retained as a COC if it contributed to a total cancer risk greater than 1x10<sup>-4</sup> or to a target organ hazard index greater than 1.

# TABLE 5-55 CHEMICALS RETAINED AS CHEMICALS OF CONCERN FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

	Receptor											
	Current	Current Adult	Current	Current	Future	Future Adult	Future	Current/Future	Future	Hypothetical	Hypothetical	Hypothetical
Chemical	Adolescent		Lifelona	Industrial	Adolescent			Construction	Industrial	Child	Adult	Lifelong
	Trespassers	Trespassers	Trespassers	Workers	Trespassers	Trespassers	Trespassers	Workers	Workers	Residents	Residents	Residents
	Surface Soil											
Benzo(a)anthracene										X		X
Benzo(a)pyrene										Х		X
Benzo(b)fluoranthene										X		X
Dibenzo(a,h)anthracene										X		X
Arsenic										X		X
Chromium VI										X		X
Subsurface Soil												
No COCs were identified for subsurface soil.												
Groundwater												
Manganese		X										

X - Chemical is retained as a chemical of concern (COC).

A chemical is retained as a COC if it contributed to a total cancer risk greater than 1x10<sup>4</sup> or to a target organ hazard index greater than 1.

## TABLE 5-56 CHEMICALS RETAINED AS CHEMICALS OF CONCERN SOUTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

		Receptor												
	Current	Trespassers	Current	Current	Future	Future Adult Trespassers	Future	Current/Future	Future	Hypothetical	Hypothetical	Hypothetical		
Chemical	Adolescent		Lifelong	Industrial	Adolescent		Lifelong	Construction	Industrial	Child	Adult	Lifelong		
	Trespassers		Trespassers	Workers	Trespassers		Trespassers	Workers	Workers	Residents	Residents	Residents		
Subsurface Soil														
No COCs were identified for subsurface soil.														

X - Chemical is retained as a chemical of concern (COC).

A chemical is retained as a COC if it contributed to a total cancer risk greater than 1x10<sup>-4</sup> or to a target organ hazard index greater than 1.

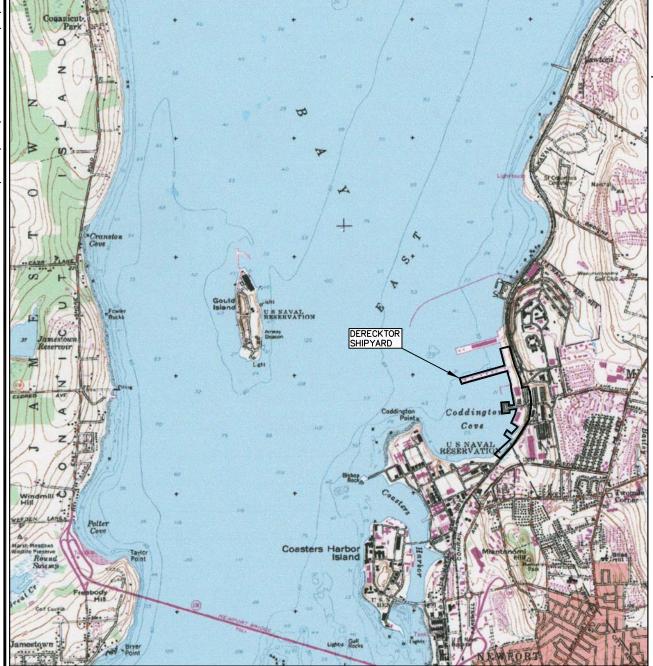
## TABLE 5-57 CHEMICALS RETAINED AS CHEMICALS OF CONCERN PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

	Receptor											
Chemical	Current Adolescent	Current Adult Trespassers	Current Lifelong	Current Industrial	Future Adolescent	Future Adult Trespassers	Future Lifelong	Current/Future Construction	Future Industrial	Hypothetical Child	Hypothetical Adult	Hypothetical Lifelong
	Trespassers	Trespassers	Trespassers	Workers	Trespassers	rrespassers	Trespassers	Workers	Workers	Residents	Residents	Residents
					Su	rface Soil						
Benzo(a)anthracene										X		X
Benzo(a)pyrene										X		X
Benzo(b)fluoranthene										X		X
Benzo(k)fluoranthene												X
Dibenzo(a,h)anthracene										X		X
Indeno(1,2,3-cd)pyrene										X		X
Total Aroclors												X
Arsenic										X		X
Subsurface Soil												
Benzo(a)pyrene												X
Benzo(b)fluoranthene												X
Dibenzo(a,h)anthracene									•			X
Arsenic									•	X		X
Chromium VI												X

X - Chemical is retained as a chemical of concern (COC).

A chemical is retained as a COC if it contributed to a total cancer risk greater than 1x10<sup>-4</sup> or to a target organ hazard index greater than 1.





BASE MAP IS A PORTION OF THE FOLLOWING 7.5 X 15 MINUTE U.S.G.S. QUADRANGLE: PRUDENCE ISLAND, RHODE ISLAND, 1955, PHOTOREVISED 1970 AND 1975







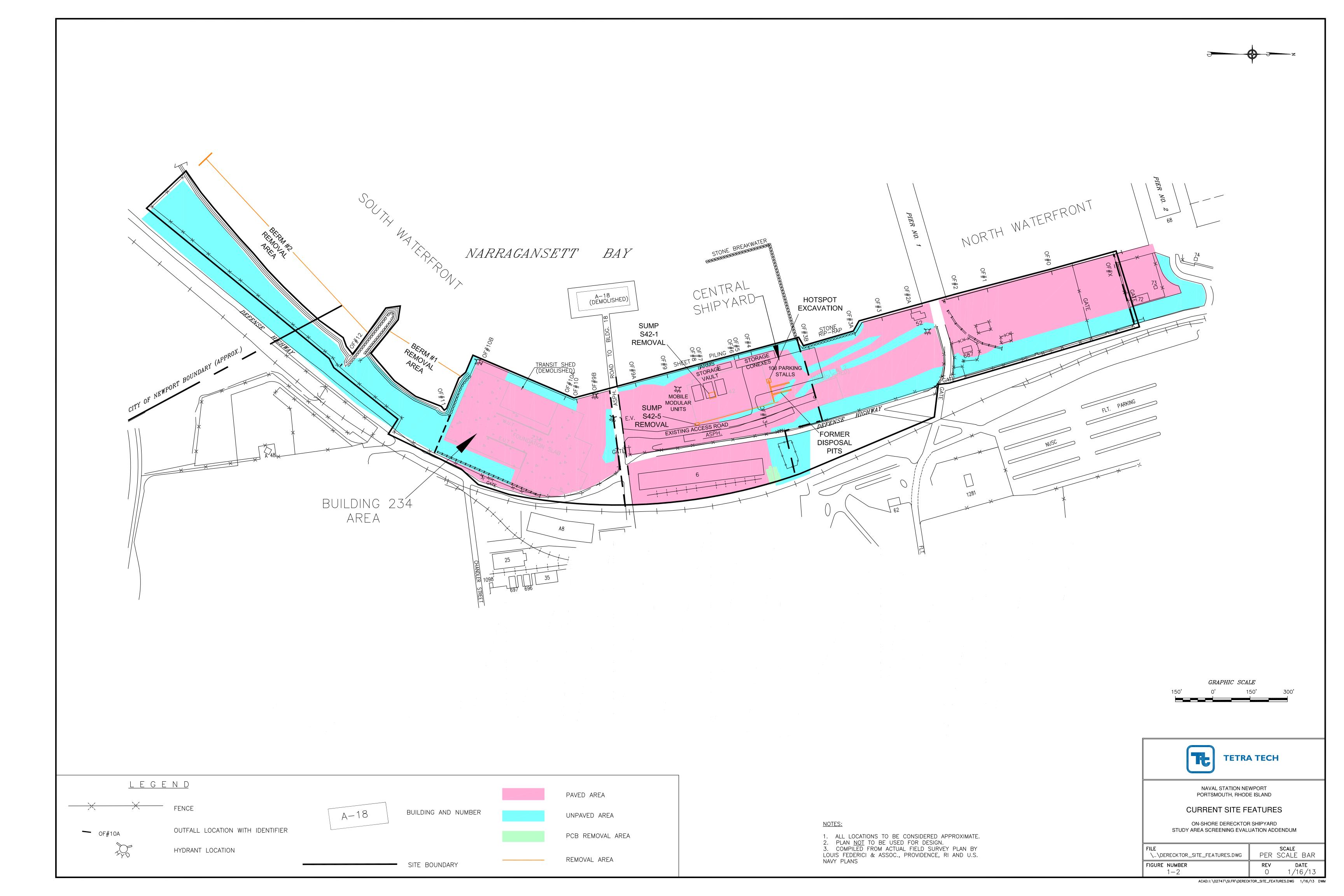
NAVAL STATION NEWPORT PORTSMOUTH, RHODE ISLAND

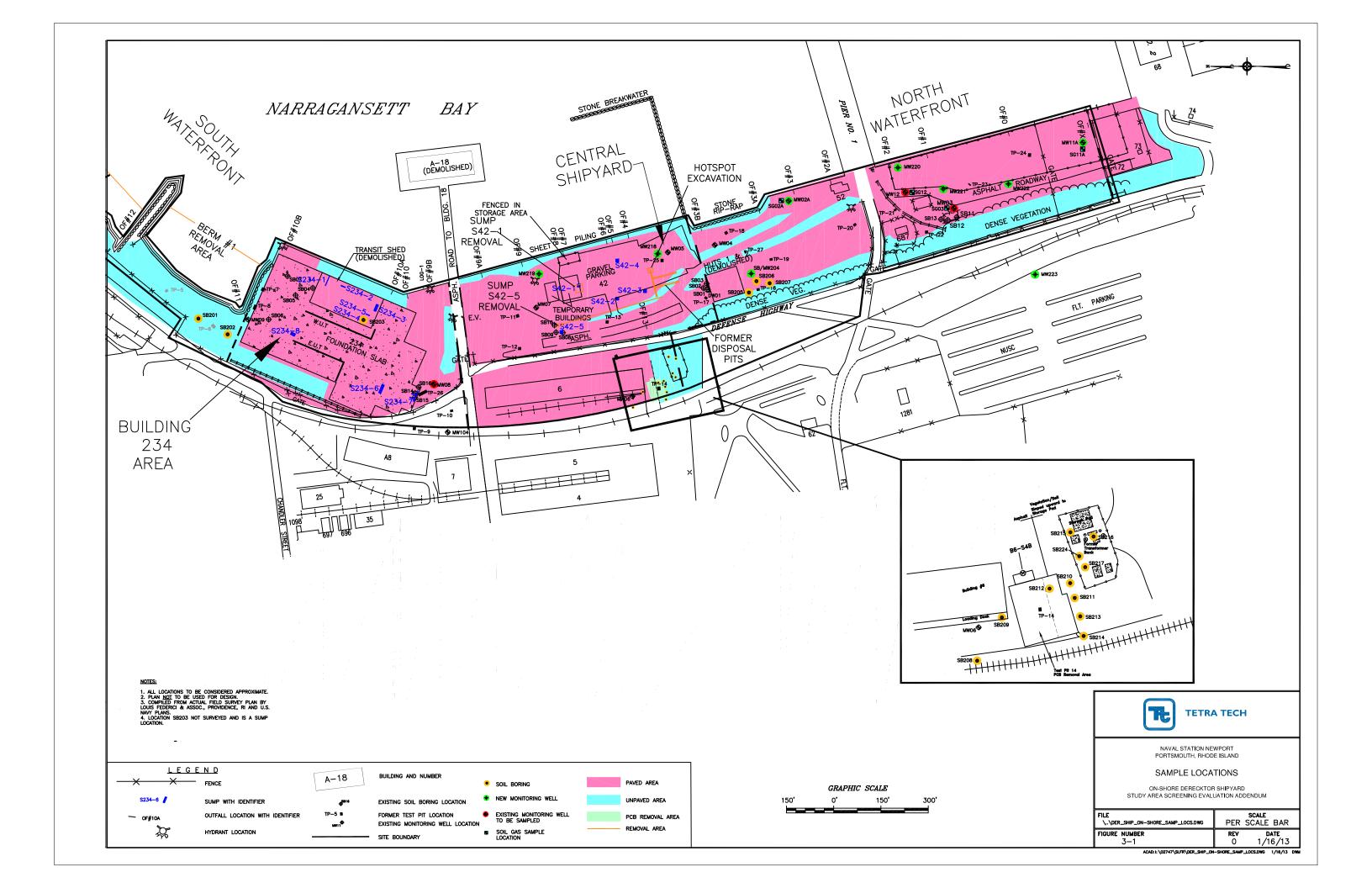
#### SITE LOCUS

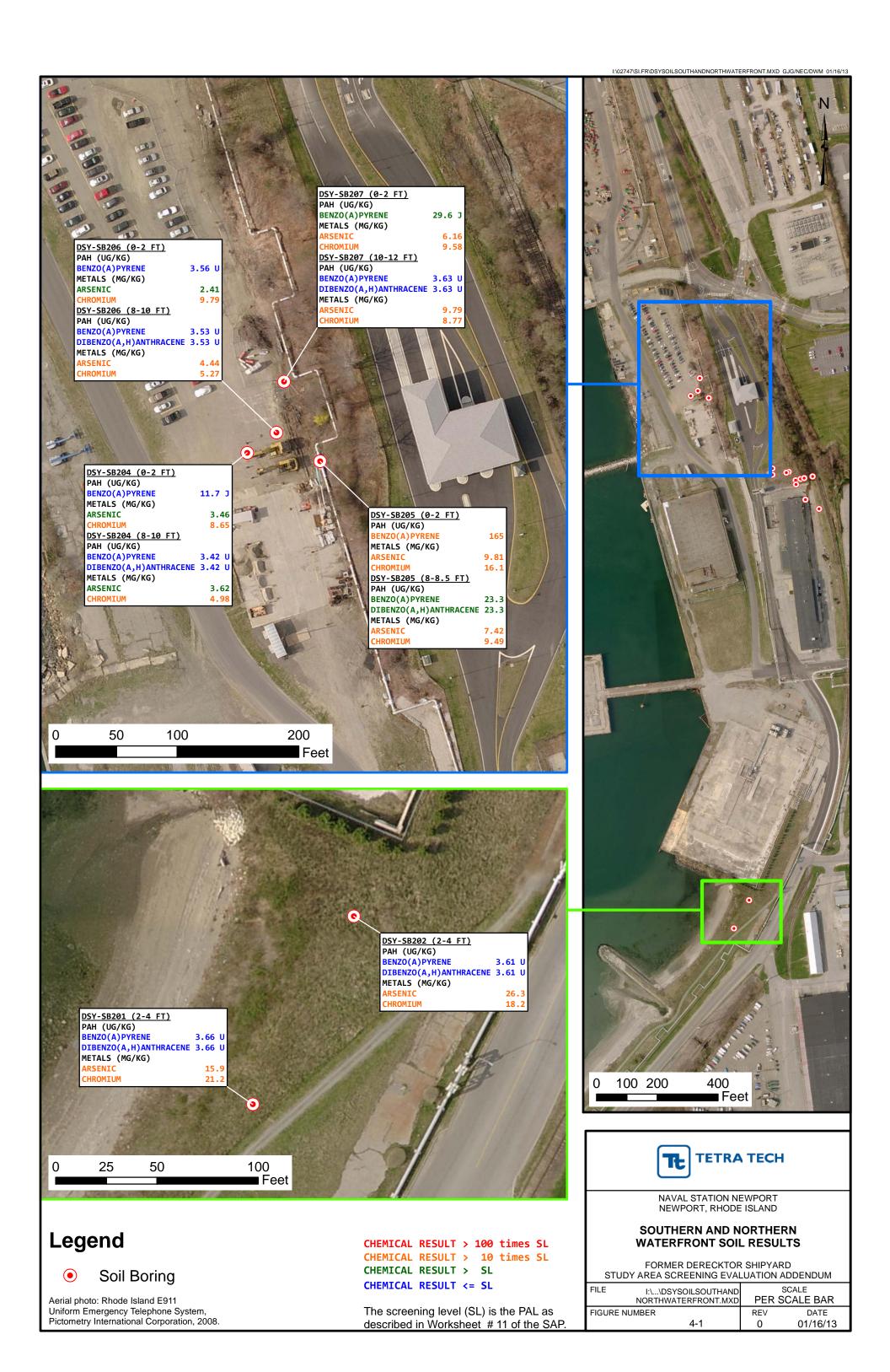
ON-SHORE DERECKTOR SHIPYARD STUDY AREA SCREENING EVALUATION ADDENDUM

SCALE								
PER SC	ALE BAR							
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REV	DATE							
Λ	1 /16 /13							

FIGURE NUMBER 1-1









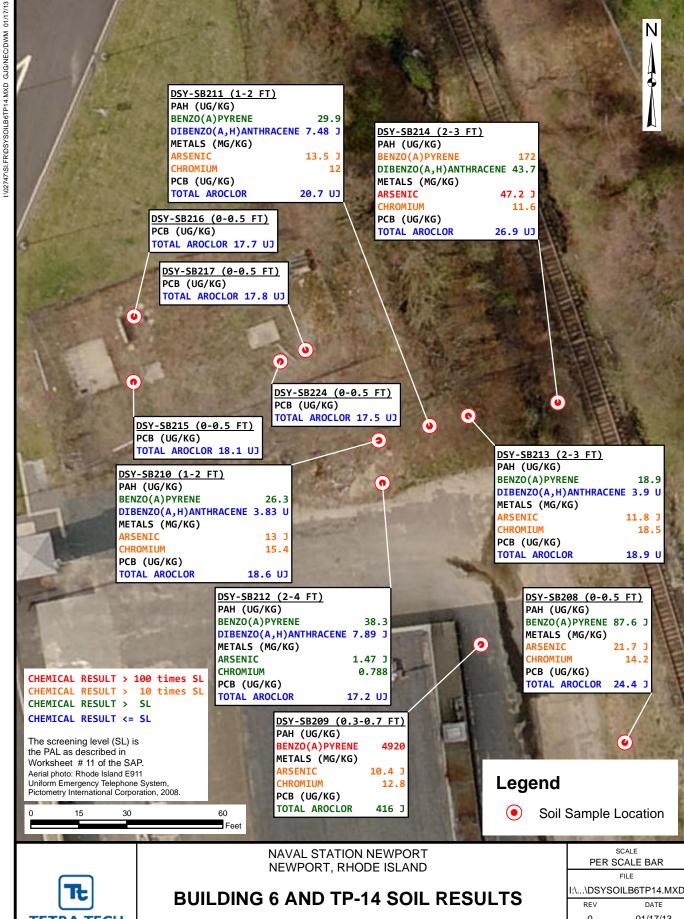


NEWPORT, RHODE ISLAND

#### **VOCs IN GROUNDWATER - CENTRAL WATERFRONT**

FORMER DERECKTOR SHIPYARD STUDY AREA SCREENING EVALUATION ADDENDUM

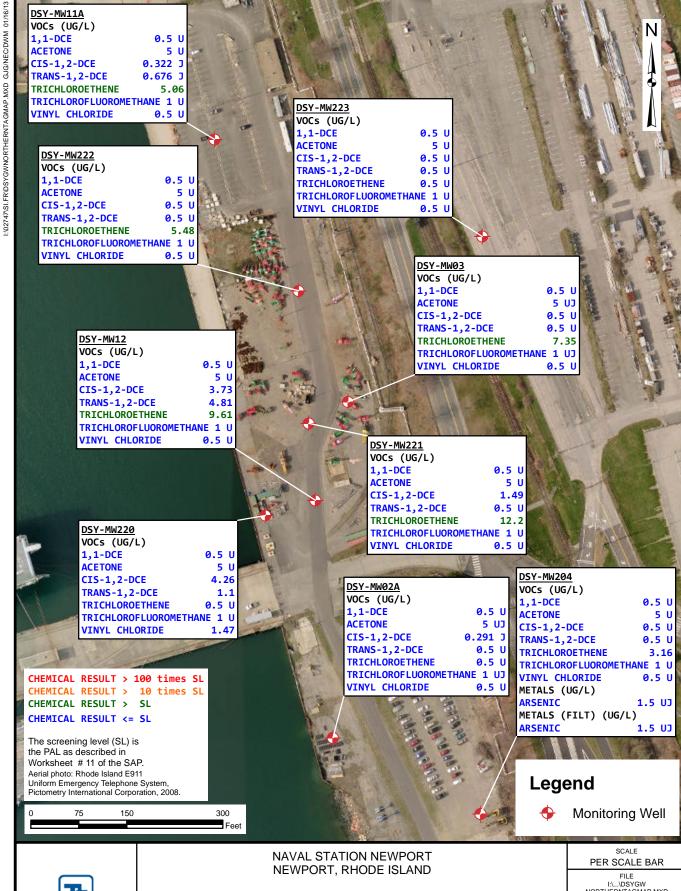
SCALE						
PER SCALE BAR						
FILE						
I:\\DSYGWCI	I:\\DSYGWCENTRALTAGMAP.MXD					
REV	DATE					
0 01/16/13						
FIGU	FIGURE NUMBER					
4-2						





FORMER DERECKTOR SHIPYARD STUDY AREA SCREENING EVALUATION ADDENDUM

	THE RESERVE					
;	SCALE					
PER SCALE BAR						
FILE						
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l	4.0					

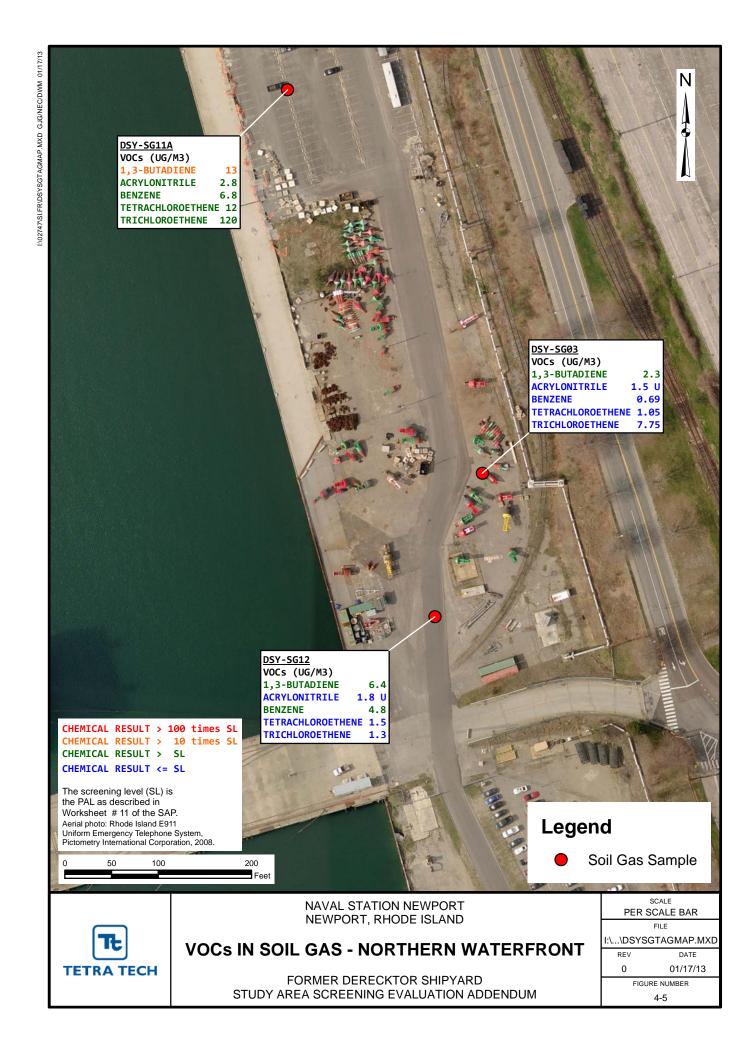


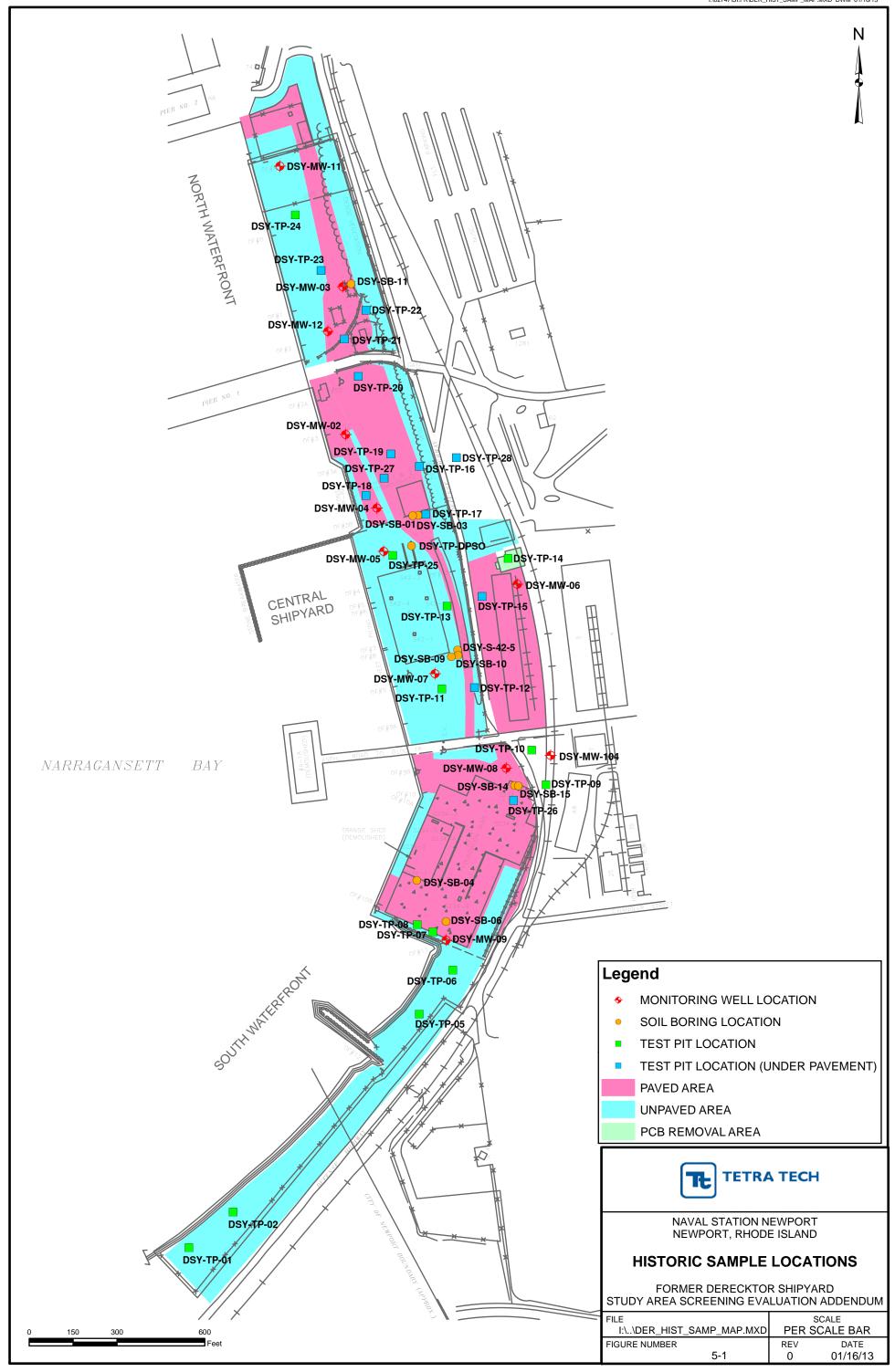


#### **VOCs IN GROUNDWATER - NORTHERN WATERFRONT**

FORMER DERECKTOR SHIPYARD STUDY AREA SCREENING EVALUATION ADDENDUM

	The state of the state of						
SCALE							
PER SCALE BAR							
1:\\	FILE DSYGW NTAGMAP.MXD						
REV	DATE						
0 01/16/13							
FIGURE NUMBER							





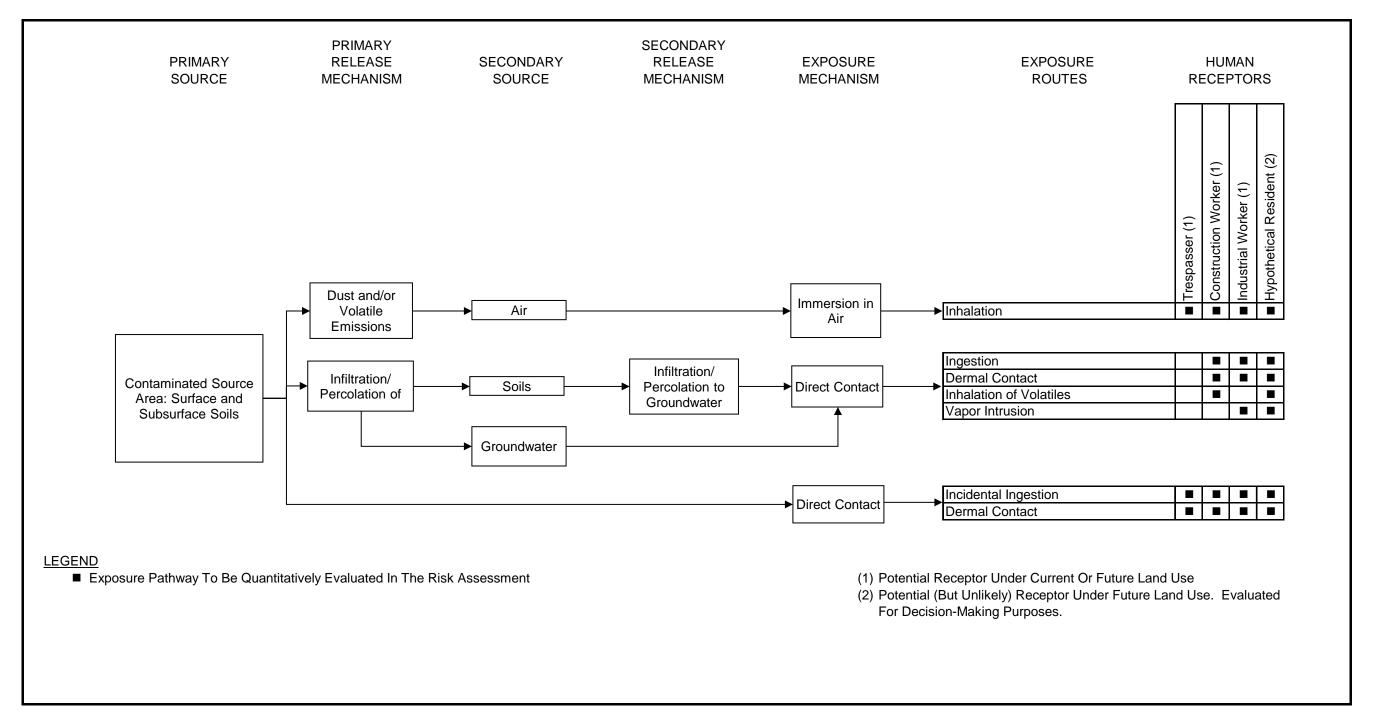


FIGURE 5-2

HUMAN HEALTH CONCEPTUAL SITE MODEL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND



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W5211766F R-2 CTO WE20

# APPENDIX A FIELD DOCUMENTATION FORMS





Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard Log Page 1 of 1

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-SB201-SO-0204 Sampler: Robin Clark

Location ID: DSY-SB201 MS/MSD: NA

Sample Information							
Date	N/A	Concentration	Not known				
Sample Source	Subsurface Soil-SB	Sample Data Type	Grab				

Sample Details							
Date	Time	method	Monitor	Depth	Color	Notes	
02/11/11	8:35	Split spoon	N/A	S-2	On Boring Log	None	

Labo	Laboratory Analysis										
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.	
*	02/11/11	8:35	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1	
<b>*</b>	02/11/11	8:35	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1	

General Notes	
None	

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-SB202-SO-0204 Sampler: Robin Clark

Location ID: DSY-SB202 MS/MSD: NA

Sample Information								
Date	02/09/11	Concentration	Low concentration					
Sample Source	Subsurface Soil-SB	Sample Data Type	Grab					

Sample Details							
Date	Time	method	Monitor	Depth	Color	Notes	
02/09/11	13:45	Split spoon	N/A	S-2	On Boring Log	None	

Labo	Laboratory Analysis										
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.	
*	02/09/11	13:45	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1	
<b>*</b>	02/09/11	13:45	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1	

General Notes	
None	



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard Log Page 1 of 1

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-SB204-SO-0810 Sampler: Robin Clark

Location ID: DSY-SB204 MS/MSD: NA

QC Duplicate ID: N/A

Sample Information							
Date	02/11/11	Concentration	Not known				
Sample Source	Subsurface Soil-SB	Sample Data Type	Grab				

Sample Details								
Date	Time	method	Monitor	Depth	Color	Notes		
02/11/11	12:11	Split spoon	N/A	S-5	On Boring Log	None		

Labo	Laboratory Analysis									
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
<b>*</b>	02/11/11	12:11	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
~	02/11/11	12:11	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
<b>~</b>	02/11/11	12:11	VOCs	SW-846 8260B	4°C/MeOH	3	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
*	02/11/11	12:11	Percent Moisture for VOCs	Percent Moisture	None	1	Glass - Clear	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
<b>&gt;</b>	02/11/11	12:11	DRO	SW-846 8015B.	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
✓	02/11/11	12:11	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SB204-SO-0002
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB204
 MS/MSD:
 NA

QC Duplicate ID: DSY-SO-DUP01-021411

Sample Information									
Date	02/14/11	Concentration	Not known						
Sample Source	Surface Soil-SS	Sample Data Type	Grab						

Sample Details								
Date	Time	method	Monitor	Depth	Color	Notes		
02/14/11	14:00	Split spoon	N/A	S-1	On Boring Log	None		

Labo	ratory An	alysis	5							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
~	02/14/11	14:00	VOCs	SW-846 8260B	4°C/MeOH+D I Combo	3	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
*	02/14/11	14:00	Percent Moisture for VOCs	Percent Moisture	None	1	Plastic - PE	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
~	02/14/11	14:00	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
<b>&gt;</b>	02/14/11	14:00	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
*	02/14/11	14:00	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
>	02/14/11	14:00	DRO	SW-846 8015B.	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1

General Notes
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Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SB205-SO-0002
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB205
 MS/MSD:
 MS/MSD

QC Duplicate ID: N/A

Sample Information								
Date	N/A	Concentration	N/A					
Sample Source	N/A	Sample Data Type	N/A					

Sample Details								
Date	Time	method	Monitor	Depth	Color	Notes		
02/15/11	12:10	Trowel	N/A	S-1	On Boring Log	None		

Labo	ratory An	alysis	5							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
<b>*</b>	02/15/11	12:10	VOCs	SW-846 8260B	4°C/MeOH+D I Combo	9	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
<b>*</b>	02/15/11	12:10	Percent Moisture for VOCs	Percent Moisture	None	3	Glass - Clear	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
~	02/15/11	12:10	DRO	SW-846 8015B.	4°C	3	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
>	02/15/11	12:10	Metals	SW-846 6010B	4°C	2	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
>	02/15/11	12:10	PAHs	SW-846 8270C	4°C	3	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
✓	02/15/11	12:10	GRO	SW-846 8015B	4°C/MeOH	3	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1

General Notes
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Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-SB205-SO-088.5 Sampler: Robin Clark

Location ID: DSY-SB205 MS/MSD: NA

QC Duplicate ID: N/A

Sample Information									
Date	02/15/11	Concentration	Not known						
Sample Source	Subsurface Soil-SB	Sample Data Type	Grab						

Sample Details						
Date	Time	method	Monitor	Depth	Color	Notes
02/15/11	12:30	Split spoon	N/A	S-5	On Boring Log	poor recovery

Labo	ratory An	alysis	3							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
✓	02/15/11	12:30	VOCs	SW-846 8260B	4°C/MeOH+D I Combo	3	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
*	02/15/11	12:30	Percent Moisture for VOCs	Percent Moisture	None	1	Glass - Clear	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
~	02/15/11	12:30	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
*	02/15/11	12:30	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
✓	02/15/11	12:30	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
~	02/15/11	12:30	DRO	SW-846 8015B.	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1

G	eı	ne	ra	11	V	ot	e	Ş

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SB206-SO-0002
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB206
 MS/MSD:
 NA

QC Duplicate ID: N/A

Sample Information								
Date	02/14/11	Concentration	Not known					
Sample Source	Surface Soil-SS	Sample Data Type	Grab					

Sample Details						
Date	Time	method	Monitor	Depth	Color	Notes
02/14/11	14:55	Split spoon	N/A	S-1	On Boring Log	None

Labo	ratory An	alysis	3							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
*	02/14/11	14:55	VOCs	SW-846 8260B	4°C/MeOH	3	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
>	02/14/11	14:55	Percent Moisture for VOCs	Percent Moisture	None	1	Plastic - PE	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
~	02/14/11	14:55	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
*	02/14/11	14:55	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
❖	02/14/11	14:55	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
*	02/14/11	14:55	DRO	SW-846 8015B.	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap		ED00000152-1

General Notes
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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard Log Page 1 of 1

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-SB206-SO-0810 Sampler: Robin Clark

Location ID: DSY-SB206 MS/MSD: NA

QC Duplicate ID: N/A

Sample Information								
Date	N/A	Concentration	None					
Sample Source	None	Sample Data Type	None					

Sample Details						
Date	Time	method	Monitor	Depth	Color	Notes
02/14/11	14:55	Split spoon	N/A	S-5	On Boring Log	None

Labo	ratory An	alysis	5							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
✓	02/14/11	14:55	VOCs	SW-846 8260B	4°C/MeOH+D I Combo	3	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
~	02/14/11		Percent Moisture for VOCs	Percent Moisture	None	1	Plastic - PE	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
~	02/14/11	14:55	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
<b>~</b>	02/14/11	14:55	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
~	02/14/11	14:55	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
*	02/14/11	14:55	DRO	SW-846 8015B.	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1

G	en	er	al I	N	ote	es



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard Log Page 1 of 1

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-SB207-SO-0002 Sampler: Robin Clark

Location ID: DSY-SB207 MS/MSD: NA

QC Duplicate ID: N/A

Sample Information							
Date	02/15/11	Concentration	Not known				
Sample Source	Surface Soil-SS	Sample Data Type	Grab				

Sample Details							
Date	Time	method	Monitor	Depth	Color	Notes	
02/15/11	9:05	Split spoon	N/A	S-1	On Boring Log	None	

Labo	ratory An	alysis	5							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
<b>&gt;</b>	02/15/11	9:05	VOCs	SW-846 8260B	4°C/MeOH+D I Combo	3	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
*	02/15/11	9:05	Percent Moisture for VOCs	Percent Moisture	None	1	Glass - Clear	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
*	02/15/11	9:05	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
*	02/15/11	9:05	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
<b>&gt;</b>	02/15/11	9:05	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
×	02/15/11	9:05	DRO	SW-846 8015B.	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap		ED00000152-1

G	en	er	al I	N	ote	es

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-SB207-SO-1012 Sampler: Robin Clark

Location ID: DSY-SB207 MS/MSD: NA

QC Duplicate ID: N/A

Sample Information								
Date	02/15/11	Concentration	Not known					
Sample Source	Subsurface Soil-SB	Sample Data Type	Grab					

Sample Details							
Date	Time	method	Monitor	Depth	Color	Notes	
02/15/11	9:35	Shelby Tube	N/A	S-6	On Boring Log	None	

Labo	Laboratory Analysis									
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
*	02/15/11	9:35	VOCs	SW-846 8260B	4°C/MeOH+D I Combo	3	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
*	02/15/11	9:35	Percent Moisture for VOCs	Percent Moisture	None	1	Glass - Clear	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
*	02/15/11	9:35	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
*	02/15/11	9:35	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-1
*	02/15/11	9:35	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-1
×	02/15/11	9:35	DRO	SW-846 8015B.	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap		ED00000152-1

G	en	er	al I	N	ote	es



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard Log Page 1 of 1

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SO-SB208-000.5
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB208
 MS/MSD:
 MS/MSD

QC Duplicate ID: DSY-SO-DUP02-0211

Sample Information								
Date	02/25/11	Concentration	Not known					
Sample Source	Surface Soil-SS	Sample Data Type	Grab					

Sample Details							
Date	Time	method	Monitor	Depth	Color	Notes	
02/25/11	13:12	Hand auger	N/A	S-1		Dark Brown f-c SAND and SILT little Gravel	

Labor	Laboratory Analysis									
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
~	02/25/11	13:12	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
~	02/25/11	13:12	PCBs	SW-846 8082	4°C	3	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	Run MS/MSD	ED00000152-3
~	02/25/11	13:12	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:12	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:12	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-3

General Notes	
None	

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SO-SB209-0.30.7
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB209
 MS/MSD:
 NA

QC Duplicate ID: N/A

Sample Information								
Date	02/25/11	Concentration	Not known					
Sample Source	Surface Soil-SS	Sample Data Type	Grab					

Sample Details								
Date	Time	method	Monitor	Depth	Color	Notes		
02/25/11	10:05	DPT	N/A	S-1		Damp Dense Gravel some F/C Sand little Silt		

Labo	ratory An	alysis	5							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
~	02/25/11	10:05	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
<b>*</b>	02/25/11	10:05	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
~	02/25/11	10:05	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
<b>&gt;</b>	02/25/11		Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
<b>✓</b>	02/25/11	10:05	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-3

# **General Notes**

Soil sample collected from hand auger boring from 0.3' to 0.7' bgs.

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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SO-SB210-0102
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB210
 MS/MSD:
 NA

Sample Information							
Date	02/25/11	Concentration	Not known				
Sample Source	Surface Soil-SS	Sample Data Type	Grab				

Sample Details								
Date	Time	method	Monitor	Depth	Color	Notes		
02/25/11	12:30	DPT	N/A	S-1		Damp Loose Brown SILT some Gravel little F/C Sand		

Labor	ratory An	alysis	5							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
~	02/25/11	12:30	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
~	02/25/11	12:30	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
~	02/25/11	12:30	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	12:30	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
<b>~</b>	02/25/11	12:30	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-3

General Notes	
None	



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard Log Page 1 of 1

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SO-SB211-0102
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB211
 MS/MSD:
 NA

Sample Information							
Date	02/25/11	Concentration	Not known				
Sample Source	Surface Soil-SS	Sample Data Type	Grab				

Sample Details								
Date	Time	method	Monitor	Depth	Color	Notes		
02/25/11	13:30	Hand auger	N/A	S-1		Damp D. Brown SILT little Gravel little F/C Sand		

Labor	ratory An	alysis	5							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
~	02/25/11	13:30	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
~	02/25/11	13:30	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
~	02/25/11	13:30	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
~	02/25/11	13:30	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
<b>~</b>	02/25/11	13:30	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-3

General Notes	
None	

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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SO-SB212-0204
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB212
 MS/MSD:
 NA

Sample Information								
Date	02/25/11	Concentration	Not known					
Sample Source	Subsurface Soil-SB	Sample Data Type	Grab					

Sample Details								
Date	Time	method	Monitor	Depth	Color	Notes		
08/30/11	7:54	DPT	N/A	S-1		Damp Dense Gravel some F/C Sand little Silt		

Labo	ratory An	alysis	5							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
~	02/25/11	7:54	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
~	02/25/11	7:54	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
<b>*</b>	02/25/11	7:54	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
<b>*</b>	02/25/11	7:54	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-3
*	02/25/11	7:54	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3

General Notes	
None	

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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SO-SB213-0203
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB213
 MS/MSD:
 NA

Sample Information							
Date	02/25/11	Concentration	Not known				
Sample Source	Surface Soil-SS	Sample Data Type	Grab				

Sample Details							
Date	Time	method	Monitor	Depth	Color	Notes	
02/25/11	13:20	Hand auger	N/A	S-1		Damp Dense Gravel some F/C Sand little Silt	

Labo	ratory An	alysis	5							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
*	02/25/11	13:20	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
*	02/25/11	13:20	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
~	02/25/11	13:20	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:20	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
<b>✓</b>	02/25/11	13:20	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-3

<b>General Notes</b>			
None			

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-SO-SB214-0203 Sampler: Miki Alroy Location ID: DSY-SB214 MS/MSD: NA

Sample Information							
Date	02/25/11	Concentration	Not known				
Sample Source	Surface Soil-SS	Sample Data Type	Grab				

Sample Details							
Date	Time	method	Monitor	Depth	Color	Notes	
02/25/11	13:35	Hand auger	N/A	S-1		Wet Loose D. Brown F/C SAND some gravel little Silt	

Labo	Laboratory Analysis									
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
~	02/25/11	13:35	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
*	02/25/11	13:35	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
~	02/25/11	13:35	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
*	02/25/11	13:35	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide- mouth w/Tefl on cap	None	ED00000152-3
<b>*</b>	02/25/11	13:35	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre- tared)	None	ED00000152-3

General Notes	
None	



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard Log Page 1 of 1

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SO-SB215-000.5
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB215
 MS/MSD:
 NA

Sample Information							
Date	02/22/11	Concentration	Not known				
Sample Source	Surface Soil-SS	Sample Data Type	Grab				

Sample Details							
Date	Time	method	Monitor	Depth	Color	Notes	
02/22/11	15:00	Hand auger	N/A	S-1		Dry M. Dense F/C SAND and GRAVEL little Silt	

Labo	aboratory Analysis											
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.		
>	02/22/11	15:00	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3		

General Notes	
None	

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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-SO-SB216-000.5 Sampler: Miki Alroy Location ID: DSY-SB216 MS/MSD: NA

Sample Information										
Date	02/22/11	Concentration	Not known							
Sample Source	Surface Soil-SS	Sample Data Type	Grab							

Sample Details	Sample Details										
Date	Time	method	Monitor	Depth	Color	Notes					
02/22/11	15:35	Hand auger	N/A	S-1		Dry M. Dense F/C SAND and GRAVEL little Silt					

l	Labo	Laboratory Analysis											
l	Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.		
	>	02/22/11	15:35	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap		ED00000152-3		

General Notes	
None	



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard Log Page 1 of 1

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SO-SB217-000.5
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB217
 MS/MSD:
 NA

Sample Information										
Date	02/22/10	Concentration	Not known							
Sample Source	Surface Soil-SS	Sample Data Type	Grab							

Sample Details										
Date	Time	method	Monitor	Depth	Color	Notes				
02/22/11	15:40	Hand auger	N/A	S-1		Dry M. Dense Brown F/C SAND and GRAVEL little Silt				

Labo	aboratory Analysis											
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	<b>COC Notes</b>	Chain No.		
<b>*</b>	02/22/11	15:40	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3		

General Notes	
None	



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard Log Page 1 of 1

Project No: 112G02125.SA.DM (ED00000152)

 Sample ID:
 DSY-SO-SB224-000.5
 Sampler:
 Miki Alroy

 Location ID:
 DSY-SB224
 MS/MSD:
 NA

QC Duplicate ID: DSY-SO-DUP01-022211

Sample Information										
Date	02/22/11	Concentration	Not known							
Sample Source	Surface Soil-SS	Sample Data Type	Grab							

Sample Details	Sample Details										
Date	Time	method	Monitor	Depth	Color	Notes					
02/22/11	16:00	Hand auger	N/A	S-1		Dry M. Dense Brown F/C SAND and GRAVEL little Silt					

Labo	aboratory Analysis												
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.			
>	02/22/11	16:00	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide- mouth w/Tefl on cap	None	ED00000152-3			

General Notes	
None	



# **GROUNDWATER SAMPLE LOG SHEET**

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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID:DSY-GW-MW02A-022411Sampler:Amy CareyWell ID:DSY-MW02AWell Type:Monitoring Well

QC Duplicate ID: N/A MS/MSD: N/A

Well Information										
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	11.64							
Top of Screen (ft-BTOR)	16	H&S PID Monitor Reading (ppm)	0.0							
Bottom of Screen (ft-BTOR)	26	Purge Method	Low flow - peristaltic							
Total Depth of Well (ft-BTOR)	26	Sample Method	Low Flow Bladder							

Equipment					
Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A

Purge I	nforma	tion											
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/24/11	9:51	11.65	100.0	Clear	Hydrog en sulfide - slight	8.40	0.819	0.72	5.92	6.4	64.7	0.40	NA
02/24/11	10:03	11.63	100.0	Clear		8.48	0.797	0.55	5.03	11.2	45.3	0.39	NA
02/24/11	10:09	11.60	250.0	Clear	Hydrog en sulfide - slight	8.51	0.831	0.63	6.53	12.7	32.7	0.42	NA
02/24/11	10:14	11.60	180.0	Clear	Hydrog en sulfide - slight	8.54	0.950	0.42	5.40	12.3	22.2	0.42	NA
02/24/11	10:19	11.60	180.0	Clear	Hydrog en sulfide - slight	8.55	0.835	0.32	5.16	12.2	12.4	0.41	NA
02/24/11	10:24	11.59	180.0	Clear		8.55	0.836	0.33	4.30	12.4	0.4	0.41	NA
02/24/11	10:29	11.58	180.0	Clear	Hydrog en sulfide - slight	8.57	0.834	0.32	4.30	12.3	-8.8	0.41	NA
02/24/11	10:34	11.59	180.0	Clear	Hydrog en sulfide - slight	8.57	0.831	0.32	5.03	12.2	-18.6	0.41	NA
02/24/11	10:39	11.55	180.0	Clear		8.57	0.827	0.30	3.54	12.0	-27.0	0.41	NA
02/24/11	10:44	11.55	180.0	Clear		8.57	0.827	0.29	3.66	12.1	-36.4	0.41	NA
02/24/11	10:49	11.55	180.0	Clear	Hydrog en sulfide - slight	8.57	0.822	0.27	4.22	12.1	-44.4	0.40	NA
02/24/11	10:54	11.55	180.0	Clear		8.57	0.822	0.29	4.05	12.1	-52.2	0.41	NA
02/24/11	10:59	11.55	180.0	Clear		8.57	0.819	0.28	3.68	12.4	-60.0	0.40	NA

# **GROUNDWATER SAMPLE LOG SHEET**

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Study Area Screening Evaluation - Site 19 Event:

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-GW-MW02A-022411 Sampler: Amy Carey Well ID: DSY-MW02A Well Type: Monitoring Well

QC Duplic	ate ID:		N/A					MS/MS	D:	N/A	3		
02/24/11	11:04	11.55	180.0	Clear	Hydrog en sulfide - slight	8.58	0.817	0.24	3.81	12.4	-68.4	0.40	NA
02/24/11	11:10	11.52	180.0		Hydrog en sulfide - slight	8.57	0.811	0.26	3.10	12.3	-77.6	0.40	NA
02/24/11	11:16	11.50	180.0	Clear	Hydrog en sulfide - slight	8.57	0.817	0.24	3.24	12.1	-84.7	0.40	NA
02/24/11	11:20	11.48	180.0	Clear	Hydrog en sulfide - slight	8.58	0.812	0.24	2.97	11.9	-92.1	0.40	NA
02/24/11	11:26	11.49	180.0	Clear	Hydrog en sulfide - slight	8.58	0.816	0.22	3.06	12.0	-98.7	0.40	NA
02/24/11	11:30	11.50	180.0	Clear	Hydrog en sulfide - slight	8.57	0.811	0.23	2.82	12.0	-102.9	0.40	NA
02/24/11	11:35	11.45	100.0	Clear	Hydrog en sulfide - slight	8.58	0.807	0.23	3.43	12.0	-109.2	0.40	N/A
02/24/11	11:40	11.46	100.0	Clear	Hydroc arbon - slight	8.58	0.814	0.22	8.10	12.1	-115.5	0.40	N/A
02/24/11	11:45	11.45	150.0	Clear	Hydrog en sulfide - slight	8.61	0.809	0.23	2.82	12.1	-120.1	0.40	NA
02/24/11	11:50	11.45	150.0	Clear	Hydrog en sulfide - slight	8.58	0.810	0.22	2.66	12.0	-125.5	0.40	NA
02/24/11	11:55	11.45	150.0	Clear	Hydrog en sulfide - slight	8.57	0.808	0.22	2.09	12.1	-128.7	0.40	NA
02/24/11	12:00	11.45	150.0	Clear	Hydrog en sulfide - slight	8.58	0.806	0.22	2.76	12.0	-134.1	0.40	NA
02/24/11	12:06	11.45	150.0	Clear	Hydrog en sulfide - slight	8.58	0.805	0.22	2.96	12.1	-140.1	0.40	NA
02/24/11	12:10	11.45	150.0	Clear	Hydrog en sulfide - slight	8.57	0.808	0.24	2.35	11.9	-144.5	0.40	NA

Final P	Final Purge / Sample Data												
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:51	12:10	139	22.78		Hydrog en sulfide - slight	8.57	0.808	0.24	2.35	11.9	-144.5	0.40	NA

Lab	Laboratory Analysis												
Col	II.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.		

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Study Area Screening Evaluation - Site 19 Event:

Log Page 3 of 3 Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW02A-022411 Sample ID: Sampler: Amy Carey Well ID: DSY-MW02A Well Type: Monitoring Well

MS/MSD: QC Duplicate ID: N/A N/A

02/24/11 12:15 VOCs SW-846 8260B 4°C/HCL 3 Glass - Clear 40ml None ED00000152-2 vials

#### **General Notes**

Pump intake depth of 21' below ground surface

Saturated screen volume:

V = (0.163)(Saturated Screen Interval in feet)(Well Radius in inches^2)

V = (0.163)(10)(1^2)

V = 1.63 Gallons (x 3.79 Liters/Gallon) = 6.18 Liters

Total of 3.69 screen volumes purged

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Event: Study Area Screening Evaluation - Site 19

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW03-022411 Sample ID: Sampler: Amy Carey Well ID: DSY-MW03 Well Type: Monitoring Well

MS/MSD: N/A QC Duplicate ID: N/A

Well Information									
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	7.25						
Top of Screen (ft-BTOR)	5.79	H&S PID Monitor Reading (ppm)	N/A						
Bottom of Screen (ft-BTOR)	15.79	Purge Method	Low flow - peristaltic						
Total Depth of Well (ft-BTOR)	17.00	Sample Method	Low flow - bladder pump						

Equipment		
Water Quality Meter: N/A	Pump Control Box: N/A	Turbidity Meter: N/A

Purge I	Purge Information												
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/24/11	13:46	7.29	100.0	Clear	None	8.09	0.424	6.17	7.74	9.6	-5.5	0.21	NA
02/24/11	13:52	8.32	120.0	Clear	None	6.29	0.438	4.33	5.45	10.3	2.9	0.21	NA
02/24/11	13:57	7.35	275.0	Clear	None	5.81	0.433	4.17	4.33	11.4	8.3	0.21	NA
02/24/11	14:05	7.41	240.0	Clear	None	5.50	0.432	4.16	4.04	11.3	18.5	0.21	NA
02/24/11	14:15	7.43	240.0	Clear	None	5.53	0.439	4.09	2.80	11.4	23.4	0.21	NA
02/24/11	14:20	7.43	240.0	Clear	None	5.52	0.435	4.16	2.56	11.3	27.6	0.21	NA
02/24/11	14:25	7.43	240.0	Clear	None	5.51	0.437	4.10	3.01	11.3	30.5	0.21	NA
02/24/11	14:30	7.43	240.0	Clear	None	5.50	0.437	4.05	1.56	11.3	34.2	0.21	NA
02/24/11	14:35	7.43	240.0	Clear	None	5.50	0.434	4.13	2.23	11.3	37.0	0.21	NA
02/24/11	14:40	7.43	240.0	Clear	None	5.49	0.437	4.08	2.65	11.2	40.7	0.21	NA
02/24/11	14:45	7.43	240.0	Clear	None	5.49	0.435	4.13	2.64	11.3	42.6	0.21	NA
02/24/11	14:50	7.43	240.0	Clear	None	5.49	0.437	4.10	1.61	11.2	46.1	0.21	NA
02/24/11	14:56	7.43	240.0	Clear	None	5.49	0.436	4.12	2.56	11.3	48.6	0.21	NA
02/24/11	15:00	7.43	240.0	Clear	None	5.49	0.436	4.11	3.09	11.2	50.8	0.21	NA
02/24/11	15:05	7.43	240.0	Clear	None	5.49	0.435	4.10	2.38	11.2	52.4	0.21	NA

Final Pu	Final Purge / Sample Data												
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
13:46	15:05	79	18.415	Clear	None	5.49	0.435	4.10	2.38	11.2	52.4	0.21	NA

Laboratory Analysis											
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	<b>COC Notes</b>	Chain No.	
<	02/24/11	15:10	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-2	

#### **General Notes**

Pump intake 12'

Saturated screen volume:

V = (0.163)(Saturated Screen Interval in feet)(Well Radius in inches^2)
V = (0.163)(10)(1^2)
V = 1.63 Gallons (x 3.79 Liters/Gallon) = 6.18 Liters
Total of 2.98 screen volumes purged

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Study Area Screening Evaluation - Site 19 Event:

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW08-030111 Sampler: Sample ID: Miki Alroy Well ID: DSY-MW08 Well Type: Monitoring Well QC Duplicate ID: N/A MS/MSD: MS/MSD

Well Information									
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	6.95						
Top of Screen (ft-BTOR)	6.05	H&S PID Monitor Reading (ppm)	0.0						
Bottom of Screen (ft-BTOR)	11.05	Purge Method	Low flow - peristaltic						
Total Depth of Well (ft-BTOR)	11.50	Sample Method	Low flow - bladder pump						

Equipment					
Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A

Purge li	Purge Information												
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/01/11	10:27	6.95	100.0	Slightly Turbid	None	6.28	885	1.68	200	8.1	139.1	0.44	N/A
03/01/11	10:42	6.95	100.0	Slightly Turbid	None	6.45	886	1.39	200	7.7	116.9	0.44	N/A
03/01/11	10:47	7.04	100.0	Clear	None	6.40	885	0.65	76.3	7.9	102.9	0.44	N/A
03/01/11	10:52	6.95	100.0	Clear	None	6.32	892	0.48	37.3	8.1	102	0.44	N/A
03/01/11	10:57	7.06	100.0	Clear	None	6.30	894	0.45	22.6	8.1	101.5	0.44	N/A
03/01/11	11:02	7.07	100.0	Clear	None	6.30	895	0.41	16.3	8.1	100.0	0.44	N/A
03/01/11	11:07	7.07	100.0	Clear	None	6.29	896	0.39	10.98	8.1	99.6	0.44	N/A
03/01/11	11:12	7.07	100.0	Clear	None	6.29	896	0.38	7.44	8.2	94.3	0.44	N/A
03/01/11	11:17	7.09	100.0	Clear	None	6.30	896	0.40	6.79	8.2	92.1	0.44	N/A
03/01/11	11:22	7.1	100.0	Clear	None	6.30	894	0.43	4.06	8.2	92.3	0.44	N/A
03/01/11	11:27	7.11	100.0	Clear	None	6.30	895	0.43	3.75	8.2	92.7	0.44	N/A

F	Final Purge / Sample Data													
	Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
	10:27	11:27	60	6.0	Clear	None	6.30	895	0.43	3.75	8.2	92.7	0.44	N/A

Labo	Laboratory Analysis											
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	<b>COC Notes</b>	Chain No.		
<b>~</b>	03/01/11	11:35	VOCs	SW-846 8260B	4°C/HCL	9	Glass - Clear	40ml vials	Run MS/MSD	ED00000152-4		
<b>~</b>	03/01/11	11:35	PAHs	SW-846 8270C SIM	4°C	6	Glass - Amber	1L	Run MS/MSD	ED00000152-4		
<b>*</b>	03/01/11	11:35	Metals (Total)	SW-846 6010B	4°C/HNO3	2	Plastic - PE	250ml	Run MS/MSD	ED00000152-4		
<b>~</b>	03/01/11	11:35	Metals (Dissolved)	SW-846 6010B (Field-Filtered)	4°C/HNO3	2	Plastic - PE	250ml	Run MS/MSD	ED00000152-4		

# **General Notes**

Saturated screen volume:
V = (0.163)(Saturated Screen Interval in feet)(Well Radius in inches^2)
V = (0.163)(5)(1^2)
V = 0.815 Gallons (x 3.79 Liters/Gallon) = 3.09 Liters
Total of 1.94 screen volumes purged

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Event: Study Area Screening Evaluation - Site 19

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW11A-022611 Sample ID: Sampler: Amy Carey Well ID: Well Type: Temporary Well DSY-MW11A

MS/MSD: N/A QC Duplicate ID: DSY-GW-DUP01-0211

Well Information									
Well Diameter (in.)	1	Static Water Level (ft-BTOR)	6.11 bgs						
Top of Screen (ft-BTOR)	19	H&S PID Monitor Reading (ppm)	NA						
Bottom of Screen (ft-BTOR)	29	Purge Method	Low flow - peristaltic						
Total Depth of Well (ft-BTOR)	29	Sample Method	Low flow - peristaltic						

Equipment		
Water Quality Meter: Blue	Pump Control Box: Blue	Turbidity Meter: Blue

Purge II	Purge Information													
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other	
02/26/11	11:19	8.59	350.0	Highly Turbid	None	6.77	0.540	0.37	NA	13.6	-85.6	0.26	NA	
02/26/11	11:24	8.78	350.0	Highly Turbid	None	6.67	0.535	0.44	1556	13.5	-99.1	0.26	NA	
02/26/11	11:29	8.69	275.0	Cloudy	None	6.59	0.523	0.57	NA	13.4	-103.4	0.26	NA	
02/26/11	11:34	10.31	275.0	Slightly Turbid	None	6.59	0.543	0.51	169	13.3	-127.4	0.27	NA	
02/26/11	11:39	10.47	200.0	Slightly Turbid	None	6.65	0.549	0.52	3413	13.1	-138.8	0.27	NA	
02/26/11	11:44	10.10	200.0	Cloudy	None	6.71	0.558	0.41	2371	13.3	-162.7	0.27	NA	
02/26/11	11:49	10.31	175.0	Cloudy	None	6.70	0.551	0.42	85.6	13.0	-165.5	0.27	NA	
02/26/11	11:54	10.20	200.0	Slightly Turbid	None	6.69	0.549	0.42	NA	13.3	-172.6	0.27	NA	
02/26/11	11:59	8.61	200.0	Highly Turbid	None	6.76	0.541	0.31	873	13.2	-185.2	0.26	NA	
02/26/11	12:09	6.96	200.0	Cloudy	None	6.57	0.514	0.32	197	13.2	-175.0	0.25	NA	
02/26/11	12:14	6.91	200.0	Clear	None	6.42	0.499	0.52	18.5	13.2	-147.7	0.24	NA	
02/26/11	12:21	6.90	200.0	Clear	None	6.37	0.500	0.54	1157	13.5	-144.6	0.25	NA	
02/26/11	12:29	6.77	250.0	Cloudy	None	6.66	0.561	0.30	189	13.2	-187.8	0.27	NA	
02/26/11	12:34	6.83	225.0	Slightly Turbid	None	6.69	0.548	0.33	40.1	13.1	-186.2	0.27	NA	
02/26/11	12:39	6.76	225.0	Slightly Turbid	None	6.65	0.538	0.32	14.6	13.0	-180.0	0.26	NA	
02/26/11	12:44	6.76	225.0	Clear	None	6.63	0.536	0.32	10.63	13.1	-178.1	0.26	NA	
02/26/11	12:49	6.74	225.0	Clear	None	6.61	0.533	0.36	11.5	13.3	-175.0	0.26	NA	
02/26/11	12:54	6.74	225.0	Clear	None	6.60	0.534	0.34	9.31	12.9	-173.5	0.26	NA	
02/26/11	12:59	6.74	225.0	Clear	None	6.59	0.530	0.34	8.73	13.0	-172.1	0.26	NA	
02/26/11	13:04	6.74	225.0	Clear	None	6.56	0.530	0.35	7.36	12.9	-169.9	0.26	NA	

Final P	urge / S	Sample D	Data										
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11:19	13:04	105	23.65	Clear	None	6.56	0.530	0.35	7.36	12.9	-169.9	0.26	NA

Labo	_aboratory Analysis												
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.			
<b>~</b>	02/26/11	13:10	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-4			

#### **General Notes**

Saturated screen volume:
V = (0.163)(Saturated Screen Interval in feet)(Well Radius in inches^2)
V = (0.163)(10)(0.5^2)
V = 0.41 Gallons (x 3.79 Liters/Gallon) = 1.54 Liters
Total of 15.31 screen volumes purged

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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID:DSY-GW-MW12-030311Sampler:Amy CareyWell ID:DSY-MW12Well Type:Monitoring Well

QC Duplicate ID: N/A MS/MSD: N/A

Well Information			
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	8.22
Top of Screen (ft-BTOR)	15	H&S PID Monitor Reading (ppm)	7.3
Bottom of Screen (ft-BTOR)	25	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	25	Sample Method	bladder pump

Equipment		
Water Quality Meter: N/A	Pump Control Box: N/A	Turbidity Meter: N/A

Purge Information													
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/03/11	11:50	8.30	150.0	Cloudy	None	7.78	0.620	1.83	29.6	10.5	252.1	0.30	NA
03/03/11	11:55	8.30	225.0	Slightly Turbid	None	7.76	0.622	0.80	20.9	10.9	248.8	0.30	NA
03/03/11	12:00	8.30	225.0	Clear	None	7.77	0.624	0.84	18.8	10.8	238.8	0.31	NA
03/03/11	12:05	8.30	225.0	Clear	None	7.83	0.625	0.65	16.4	11.2	22.7	0.31	NA
03/03/11	12:10	8.30	225.0	Clear	None	7.81	0.626	0.56	14.1	11.0	213.7	0.31	NA
03/03/11	12:15	8.30	225.0	Clear	None	7.87	0.627	0.46	12.9	10.9	205.8	0.31	NA
03/03/11	12:20	8.32	225.0	Clear	None	7.95	0.628	0.49	9.85	11.0	186.1	0.31	NA
03/03/11	12:25	8.32	225.0	Clear	None	7.92	0.627	0.33	8.14	11.4	165.5	0.31	NA
03/03/11	12:30	8.32	225.0	Clear	None	7.90	0.627	0.32	8.04	10.9	157.3	0.31	NA
03/03/11	12:35	8.32	225.0	Clear	None	7.93	0.627	0.60	6.08	11.2	148.6	0.31	NA
03/03/11	12:40	8.32	225.0	Clear	None	7.93	0.628	0.89	5.86	10.8	140.6	0.31	NA
03/03/11	12:45	8.32	225.0	Clear	None	7.95	0.627	0.81	5.50	11.0	129.8	0.31	NA
03/03/11	12:50	8.32	225.0	Clear	None	7.93	0.627	0.27	5.12	11.3	122.0	0.31	NA
03/03/11	12:55	8.32	225.0	Clear	None	7.91	0.627	0.26	4.11	11.2	109.4	0.31	NA
03/03/11	13:00	8.32	225.0	Clear	None	7.96	0.628	0.26	3.82	11.1	99.1	0.31	NA
03/03/11	13:05	8.32	225.0	Clear	None	7.96	0.628	0.23	4.38	11.4	90.6	0.31	NA
03/03/11	13:10	8.32	225.0	Clear	None	7.95	0.628	0.26	4.24	10.9	84.3	0.31	NA
03/03/11	13:15	8.33	225.0	Clear	None	7.95	0.628	0.24	6.50	11.0	72.4	0.31	NA
03/03/11	13:20	8.33	225.0	Clear	None	7.94	0.628	0.23	7.19	11.3	64.4	0.31	NA
03/03/11	13:25	8.34	225.0	Clear	None	7.96	0.629	0.23	6.34	11.0	53.7	0.31	NA
03/03/11	13:30	8.35	225.0	Clear	None	7.97	0.628	0.21	5.78	11.1	48.5	0.31	NA
03/03/11	13:35	8.35	225.0	Clear	None	7.96	0.628	0.61	6.01	11.0	41.7	0.31	NA
03/03/11	13:40	8.35	225.0	Clear	None	7.96	0.629	0.41	4.88	10.8	34.1	0.31	NA
03/03/11	13:45	8.35	225.0	Clear	None	7.96	0.628	0.31	4.72	11.1	26.2	0.31	NA
03/03/11	13:50	8.35	225.0	Clear	None	7.95	0.628	0.22	4.11	11.1	20.3	0.31	NA
03/03/11	13:55	8.35	225.0	Clear	None	7.96	0.628	0.21	3.21	11.0	10.3	0.31	NA
03/03/11	14:00	8.35	225.0	Clear	None	7.96	0.628	0.22	3.13	10.6	4.9	0.31	NA
03/03/11	14:05	8.35	225.0	Clear	None	7.97	0.628	0.21	3.54	10.8	-2.2	0.31	NA
03/03/11	14:10	8.35	225.0	Clear	None	7.96	0.628	0.21	3.39	10.7	-9.8	0.31	NA
03/03/11	14:15	8.35	225.0	Clear	None	7.96	0.628	0.21	4.13	10.8	-14.6	0.31	NA
03/03/11	14:20	8.35	225.0	Clear	None	7.96	0.628	0.27	3.09	10.9	-18.8	0.31	NA

Final	Final Purge / Sample Data													
Start Purge	En Pur		Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11:5	0 14	:20	150	33.75	Clear	None	7.96	0.628	0.27	3.09	10.9	-18.8	0.31	NA

# **Laboratory Analysis**

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TETRA TECH NUS, Inc.

Study Area Screening Evaluation - Site 19 Event:

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW12-030311 Amy Carey Sample ID: Sampler: Well ID: DSY-MW12 Well Type: Monitoring Well

MS/MSD: N/A QC Duplicate ID: N/A

Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.
~	03/03/11	14:26	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-6

#### **General Notes**

Amy Carey; pump intake 20' below ground. bladder pump

Saturated screen volume:

V = (0.163)(Saturated Screen Interval in feet)(Well Radius in inches^2)
V = (0.163)(10)(1^2)
V = 1.63 Gallons (x 3.79 Liters/Gallon) = 6.18 Liters
Total of 5.46 screen volumes purged

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Event: Study Area Screening Evaluation - Site 19

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW204-031711 Robin Clark Sample ID: Sampler: Well ID: DSY-MW204 Well Type: Monitoring Well

MS/MSD: N/A QC Duplicate ID: N/A

Well Information			
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	10.60
Top of Screen (ft-BTOR)	8	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	18	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	18	Sample Method	Low Flow - Bladder

Equipment		
Water Quality Meter: Black	Pump Control Box: N/A	Turbidity Meter: None

Purge li	Purge Information													
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other	
03/17/11	9:16	10.60	130.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A	
03/17/11	9:26	10.61	130.0	Highly Turbid	None	6.00	484.0	2.58	700	10.3	197.0	NA	N/A	
03/17/11	9:35	10.60	130.0	Cloudy	None	6.04	481.1	2.17	370	10.2	202.0	NA	N/A	
03/17/11	9:40	10.60	130.0	Cloudy	None	6.00	481.3	2.15	290	10.2	203.5	NA	N/A	
03/17/11	9:51	10.60	130.0	Cloudy	None	5.96	482.3	2.23	140	10.1	205.6	NA	N/A	
03/17/11	9:59	10.60	130.0	Slightly Turbid	None	6.02	483.0	2.24	95	10.1	206.7	NA	N/A	
03/17/11	10:11	10.60	130.0	Clear	None	6.05	484.6	2.37	60	10.4	206.8	NA	N/A	
03/17/11	10:22	10.60	130.0	Clear	None	6.10	485.4	2.42	30	10.4	206.0	NA	N/A	
03/17/11	10:32	10.60	130.0	Clear	None	6.11	485.9	2.54	16	10.3	205.1	NA	N/A	
03/17/11	10:44	10.60	130.0	Clear	None	6.08	486.2	2.50	16	10.5	204.0	NA	N/A	
03/17/11	10:48	10.60	130.0	Clear	None	6.08	487.0	2.47	15	10.5	203.7	NA	N/A	

F	Final Purge / Sample Data													
	Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
	9:16	10:48	92	11.96	Clear	None	6.08	487.0	2.47	15	10.5	203.7	NA	N/A

Labo	Laboratory Analysis										
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	<b>COC Notes</b>	Chain No.	
<b>~</b>	03/17/11	10:49	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-7	
~	03/17/11	10:49	PAHs	SW-846 8270C SIM	4°C	2	Glass - Amber	1L	None	ED00000152-7	
<b>*</b>	03/17/11	10:49	Metals (Total)	SW-846 6010B	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-7	
<b>~</b>	03/17/11	10:49	Metals (Dissolved)	SW-846 6010B (Field-Filtered)	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-7	

# **General Notes**

Pump Intake @ 13 feet BGS

Unsaturated screen/well volume:
V = (0.163)(Unsaturated Screen Interval in feet)(Well Radius in inches^2)
V = (0.163)(7.40)(1^2)
V = 1.21 Gallons (x 3.79 Liters/Gallon) = 4.57 Liters
Total of 2.62 water column volumes purged

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Study Area Screening Evaluation - Site 19 Event:

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW218-030111 Sample ID: Sampler: Amy Carey Well ID: DSY-MW218 Well Type: Monitoring Well

MS/MSD: N/A QC Duplicate ID: N/A

Well Information											
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	14.91								
Top of Screen (ft-BTOR)	10	H&S PID Monitor Reading (ppm)	3.4								
Bottom of Screen (ft-BTOR)	20	Purge Method	Low flow - peristaltic								
Total Depth of Well (ft-BTOR)	20	Sample Method	bladder pump								

Equipment		
Water Quality Meter: N/A	Pump Control Box: N/A	Turbidity Meter: N/A

Purge li	Purge Information												
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/01/11	12:57	14.94	275.0	Cloudy	None	7.46	0.833	2.85	84.4	9.6	80.8	0.40	NA
03/01/11	13:02	14.94	275.0	Slightly Turbid	None	6.61	0.819	0.86	68.7	9.8	72.4	0.41	NA
03/01/11	13:07	15.94	275.0	Slightly Turbid	None	6.61	0.827	0.65	46.5	9.9	64.3	0.41	NA
03/01/11	13:12	15.95	250.0	Clear	None	6.49	0.830	0.51	41.5	10.0	59.4	0.41	NA
03/01/11	13:17	14.95	250.0	Clear	None	6.48	0.826	0.36	39.5	9.9	53.3	0.41	NA
03/01/11	13:22	14.95	250.0	Clear	None	6.48	0.826	0.40	32.1	10.0	47.5	0.41	NA
03/01/11	13:27	14.95	250.0	Clear	None	6.46	0.832	0.60	29.3	10.2	40.2	0.41	NA
03/01/11	13:32	15.96	250.0	Clear	None	6.47	0.836	0.45	22.1	10.2	35.2	0.41	NA
03/01/11	13:37	14.96	250.0	Clear	None	6.48	0.841	0.53	18.1	10.2	29.1	0.41	NA
03/01/11	13:42	14.97	250.0	Clear	None	6.49	0.849	0.36	12.8	10.3	22.7	0.42	NA
03/01/11	13:47	14.97	250.0	Clear	None	6.47	0.854	0.24	13.8	10.2	17.0	0.42	NA
03/01/11	13:52	14.98	250.0	Clear	None	6.47	0.856	0.25	13.6	10.2	12.1	0.42	NA
03/01/11	13:57	14.99	250.0	Clear	None	6.48	0.864	0.27	13.0	10.2	7.7	0.43	NA

Final P	Final Purge / Sample Data												
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
12:57	13:57	60	15.25	Clear	None	6.48	0.864	0.27	13.0	10.2	7.7	0.43	NA

Labo	Laboratory Analysis									
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	<b>COC Notes</b>	Chain No.
<b>&gt;</b>	03/01/11	14:00	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-4
<b>~</b>	03/01/11	14:00	PAHs	SW-846 8270C SIM	4°C	2	Glass - Amber	1L	None	ED00000152-4
<b>~</b>	03/01/11	14:00	Metals (Total)	SW-846 6010B	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-4
<b>*</b>	03/01/11	14:00	Metals (Dissolved)	SW-846 6010B (Field-Filtered)	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-4

#### **General Notes**

Pump intake 15' below ground; bladder pump

Unsaturated screen/well volume:
V = (0.163)(Unsaturated Screen Interval in feet)(Well Radius in inches^2)
V = (0.163)(5.09)(1^2)
V = 0.83 Gallons (x 3.79 Liters/Gallon) = 3.14 Liters
Total of 4.85 water column volumes purged

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Event: Study Area Screening Evaluation - Site 19

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW219-031611 Robin Clark Sample ID: Sampler: Well ID: Well Type: Monitoring Well DSY-MW219

MS/MSD: QC Duplicate ID: DSY-GW-DUP02-031611 N/A

Well Information										
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	14.76							
Top of Screen (ft-BTOR)	10	H&S PID Monitor Reading (ppm)	0.0							
Bottom of Screen (ft-BTOR)	20	Purge Method	Low flow - peristaltic							
Total Depth of Well (ft-BTOR)	20	Sample Method	bladder							

Equipment		
Water Quality Meter: N/A	Pump Control Box: N/A	Turbidity Meter: N/A

Purge li	Purge Information												
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/16/11	8:52	14.76	200.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
03/16/11	9:02	14.90	159.0	Highly Turbid	None	7.07	680.3	0.76	9999	8.7	-68.0	NA	N/A
03/16/11	9:09	14.92	130.0	Highly Turbid	None	6.89	678.0	0.69	9999	8.7	-76.5	NA	N/A
03/16/11	9:17	14.92	130.0	Highly Turbid	None	6.90	683.5	0.43	950	8.7	-83.6	NA	N/A
03/16/11	9:30	14.94	130.0	Cloudy	None	6.94	693.3	0.38	230	8.7	-94.8	NA	N/A
03/16/11	9:46	14.94	130.0	Slightly Turbid	None	6.97	707.0	0.24	45	8.7	-105.7	NA	N/A
03/16/11	10:00	14.94	130.0	Clear	None	6.99	707.7	0.25	18	8.7	-108.5	NA	N/A
03/16/11	10:05	14.94	130.0	Clear	None	7.00	707.6	0.29	17	8.7	-109.3	NA	N/A
03/16/11	10:10	14.94	130.0	Clear	None	7.00	706.9	0.21	15	8.6	-109.4	NA	N/A

Final P	Final Purge / Sample Data												
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
8:52	10:10	78	10.43	Clear	None	7.00	706.9	0.21	15	8.6	-109.4	NA	N/A

Labo	Laboratory Analysis											
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	<b>COC Notes</b>	Chain No.		
<b>~</b>	03/16/11	10:12	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-7		
✓	03/16/11	10:12	PAHs	SW-846 8270C SIM	4°C	2	Glass - Amber	1L	None	ED00000152-7		
<b>*</b>	03/16/11	10:12	Metals (Total)	SW-846 6010B	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-7		
<b>~</b>	03/16/11	10:12	Metals (Dissolved)	SW-846 6010B (Field-Filtered)	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-7		

#### **General Notes**

pump intake at 15 ft bgs.

Unsaturated screen/well volume:

V = (0.163)(Unsaturated Screen Interval in feet)(Well Radius in inches^2)
V = (0.163)(5.24)(1^2)
V = 0.85 Gallons (x 3.79 Liters/Gallon) = 3.24 Liters
Total of 3.22 water column volumes purged

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Event: Study Area Screening Evaluation - Site 19

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW220-030111 Sample ID: Sampler: Amy Carey Well ID: DSY-MW220 Well Type: Monitoring Well

MS/MSD: QC Duplicate ID: N/A N/A

Well Information										
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	8.37							
Top of Screen (ft-BTOR)	5	H&S PID Monitor Reading (ppm)	0.0							
Bottom of Screen (ft-BTOR)	20	Purge Method	Low flow - peristaltic							
Total Depth of Well (ft-BTOR)	20	Sample Method	bladder							

Equipment					
Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A

Purge I	nforma	tion											
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/01/11	10:15	8.41	175.0	Cloudy	None	6.45	6.089	2.09	169	8.0	244.5	3.32	NA
03/01/11	10:25	8.42	150.0	Cloudy	None	6.90	6.076	1.12	149	8.2	176.0	3.30	NA
03/01/11	10:30	8.41	175.0	Slightly Turbid	None	7.02	6.067	0.88	73.6	8.7	135.2	3.31	NA
03/01/11	10:35	8.41	200.0	Slightly Turbid	None	7.10	6.063	0.64	42.6	8.8	104.0	3.30	NA
03/01/11	10:40	8.42	200.0	Slightly Turbid	None	7.16	5.999	0.90	28.9	8.8	71.4	3.27	NA
03/01/11	10:45	8.43	200.0	Slightly Turbid	None	7.15	5.928	0.82	22.5	9.0	47.0	3.22	NA
03/01/11	10:50	8.43	200.0	Slightly Turbid	None	7.18	5.929	0.62	18.2	8.9	35.7	3.22	NA
03/01/11	10:55	8.43	200.0	Clear	None	7.22	5.896	0.63	16.8	9.0	11.1	3.19	NA
03/01/11	11:00	8.43	200.0	Clear	None	7.22	5.852	0.56	13.5	9.0	-2.9	3.18	NA
03/01/11	11:05	8.43	200.0	Clear	None	7.22	5.791	0.48	11.1	8.9	-33.6	3.14	NA
03/01/11	11:10	8.43	200.0	Clear	None	7.24	5.765	0.51	10.11	8.9	-41.6	3.13	NA
03/01/11	11:15	8.44	200.0	Clear	None	7.24	5.709	1.01	8.05	9.0	-61.9	3.10	NA
03/01/11	11:20	8.45	200.0	Clear	None	7.25	5.718	0.37	6.59	9.0	-66.2	3.10	NA
03/01/11	11:25	8.45	200.0	Clear	None	7.26	5.685	0.95	5.83	9.0	-72.6	3.09	NA
03/01/11	11:30	8.45	200.0	Clear	None	7.25	5.687	1.11	4.84	9.0	-80.1	3.09	NA
03/01/11	11:35	8.46	200.0	Clear	None	7.25	5.675	0.97	3.29	9.0	-84.5	3.08	NA
03/01/11	11:40	8.46	200.0	Clear	None	7.26	5.651	0.98	3.15	9.1	-88.9	3.07	NA

Final Pu	Final Purge / Sample Data												
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
10:15	11:40	85	16.375	Clear	None	7.26	5.651	0.98	3.15	9.1	-88.9	3.07	NA

Laboratory Analysis												
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.		
<b>*</b>	03/01/11	11:45	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-4		

#### **General Notes**

Pump intake 12.5' below ground surface; bladder pump; purged ~5 gallons

Unsaturated screen/well volume:
V = (0.163)(Unsaturated Screen Interval in feet)(Well Radius in inches^2)
V = (0.163)(11.63)(1^2)
V = 1.90 Gallons (x 3.79 Liters/Gallon) = 7.18 Liters

Total of 2.28 water column volumes purged

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Study Area Screening Evaluation - Site 19 Event:

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW221-030211 Sample ID: Sampler: Amy Carey Well ID: DSY-MW221 Well Type: Monitoring Well

MS/MSD: N/A QC Duplicate ID: N/A

Well Information			
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	7.09
Top of Screen (ft-BTOR)	3	H&S PID Monitor Reading (ppm)	0.4
Bottom of Screen (ft-BTOR)	15	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	15	Sample Method	bladder pump

Equipment					
Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A

Purge II	nforma	tion											
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/02/11	12:49	7.11	300.0	Slightly Turbid	None	7.23	0.639	1.88	24.5	9.6	155.1	0.31	NA
03/02/11	12:54	7.11	300.0	Slightly Turbid	None	6.53	0.631	1.31	21.2	9.7	153.4	0.31	NA
03/02/11	12:59	7.14	225.0	Clear	None	6.11	0.650	1.14	11.8	9.6	153.7	0.32	NA
03/02/11	13:04	7.14	225.0	Clear	None	6.01	0.656	1.11	7.95	9.6	153.5	0.32	NA
03/02/11	13:09	7.15	225.0	Clear	None	5.97	0.642	1.01	4.82	9.6	153.3	0.32	NA
03/02/11	13:14	7.15	200.0	Clear	None	5.93	0.636	0.95	3.34	9.7	152.1	0.31	NA
03/02/11	13:19	7.15	200.0	Clear	None	5.92	0.620	0.93	3.01	9.8	150.7	0.30	NA
03/02/11	13:24	7.15	200.0	Clear	None	5.92	0.606	0.86	1.66	9.7	148.6	0.30	NA
03/02/11	13:29	7.15	200.0	Clear	None	5.91	0.602	0.85	0.86	9.5	146.9	0.29	NA
03/02/11	13:34	7.15	200.0	Clear	None	5.90	0.594	0.84	0.86	9.6	144.9	0.29	NA

Final Pu	Final Purge / Sample Data													
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other	
12:49	13:34	45	9.875	Clear	None	5.90	0.594	0.84	0.86	9.6	144.9	0.29	NA	

Laboratory Analysis												
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	<b>COC Notes</b>	Chain No.		
~	03/02/11	13:40	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-4		

#### **General Notes**

Pump intake at 9' below ground surface; bladder pump

Unsaturated screen/well volume:
V = (0.163)(Unsaturated Screen Interval in feet)(Well Radius in inches^2)
V = (0.163)(7.91)(1^2)
V = 1.29 Gallons (x 3.79 Liters/Gallon) = 4.89 Liters

Total of 2.02 water column volumes purged

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW222-030211 Sample ID: Sampler: Amy Carey Well ID: DSY-MW222 Well Type: Monitoring Well

MS/MSD: N/A QC Duplicate ID: N/A

Well Information			
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	5.09
Top of Screen (ft-BTOR)	4	H&S PID Monitor Reading (ppm)	1.0
Bottom of Screen (ft-BTOR)	14	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	14	Sample Method	bladder pump

Equipment					
Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A

Purge II	nforma	tion											
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/02/11	10:12	5.09	300.0	Cloudy	None	7.28	1.123	6.65	224	8.1	222.9	0.56	NA
03/02/11	10:17	5.10	300.0	Cloudy	None	7.29	1.133	6.42	185	7.8	207.6	0.57	NA
03/02/11	10:22	5.11	300.0	Cloudy	None	7.30	1.164	6.34	147	7.6	189.5	0.58	NA
03/02/11	10:27	5.11	300.0	Cloudy	None	7.32	1.152	6.35	137	7.5	180.7	0.57	NA
03/02/11	10:32	5.11	300.0	Cloudy	None	7.35	1.100	6.44	58.4	7.3	174.2	0.54	NA
03/02/11	10:37	5.11	300.0	Clear	None	7.36	1.056	0.52	37.5	7.1	169.5	0.52	NA
03/02/11	10:42	5.11	300.0	Slightly Turbid	None	7.36	1.044	6.49	25.1	7.1	163.0	0.52	NA
03/02/11	10:47	5.11	300.0	Slightly Turbid	None	7.36	1.039	6.37	21.5	7.1	159.2	0.52	NA
03/02/11	10:52	5.11	300.0	Clear	None	7.39	1.049	6.33	22.9	7.0	154.0	0.52	NA
03/02/11	10:57	5.110	250.0	Clear	None	7.33	1.056	6.28	14.0	7.0	148.9	0.53	NA
03/02/11	11:02	5.10	250.0	Clear	None	7.37	1.056	6.46	14.3	7.1	143.4	0.53	NA
03/02/11	11:07	5.10	250.0	Clear	None	7.35	1.061	6.41	15.0	7.1	139.0	0.53	NA
03/02/11	11:12	5.10	250.0	Clear	None	7.39	1.057	6.40	14.2	7.1	133.9	0.52	NA

ı	Final Pu	urge / S	Sample [	Data										
	Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
	10:12	11:12	60	17.0	Clear	None	7.39	1.057	6.40	14.2	7.1	133.9	0.52	NA

Labo	Laboratory Analysis													
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	<b>COC Notes</b>	Chain No.				
<b>~</b>	03/02/11	11:15	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-4				

#### **General Notes**

Pump intake depth 9' below ground surface; bladder pump

Unsaturated screen/well volume:

V = (0.163)(Unsaturated Screen Interval in feet)(Well Radius in inches^2)

V = (0.163)(8.91)(1^2)

V = 1.45 Gallons (x 3.79 Liters/Gallon) = 5.05 Liters

Total of 3.09 water column volumes purged

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Event: Study Area Screening Evaluation - Site 19

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-GW-MW223-031611 Robin Clark Sample ID: Sampler: Well ID: DSY-MW223 Well Type: Monitoring Well

MS/MSD: N/A QC Duplicate ID: N/A

Well Information	Well Information										
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	11.98								
Top of Screen (ft-BTOR)	41	H&S PID Monitor Reading (ppm)	0.0								
Bottom of Screen (ft-BTOR)	51	Purge Method	Low flow - peristaltic								
Total Depth of Well (ft-BTOR)	51	Sample Method	bladder pump								

Equipment					
Water Quality Meter:	black	Pump Control Box:	N/A	Turbidity Meter:	45313303

Purge I	nforma	tion											
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/15/11	14:46	11.98	100.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
03/15/11	14:51	11.98	100.0	Highly Turbid	None	7.31	346.1	0.94	9999	12.8	-48.4	NA	N/A
03/15/11	15:03	11.98	100.0	Highly Turbid	None	6.73	338.8	0.50	950	12.6	-64.5	NA	N/A
03/15/11	15:12	11.98	100.0	Highly Turbid	None	6.70	338.0	0.42	750	12.6	-66.9	NA	N/A
03/15/11	15:28	11.98	100.0	Highly Turbid	None	na	NA	NA	NA	NA	NA	NA	N/A
03/16/11	12:08	11.96	100.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
03/16/11	12:20	11.98	100.0	Cloudy	None	6.87	324.3	1.25	400	11.8	-23.8	NA	N/A
03/16/11	12:30	11.98	100.0	Cloudy	None	6.82	323.9	0.50	250	12.1	-32.5	NA	N/A
03/16/11	12:49	11.98	100.0	Slightly Turbid	None	6.80	323.5	0.40	170	12.1	-40.2	NA	N/A
03/16/11	12:59	11.98	100.0	Slightly Turbid	None	6.81	326.0	0.45	110	12.2	-45.0	NA	N/A
03/16/11	13:10	11.98	100.0	Slightly Turbid	None	6.80	322.1	0.31	60	12.3	-44.3	NA	N/A
03/16/11	13:19	11.98	100.0	Slightly Turbid	None	6.81	324.3	0.32	65	12.3	-48.4	NA	N/A
03/16/11	13:29	11.98	100.0	Clear	None	6.80	323.6	0.36	55	12.3	-49.4	NA	N/A
03/16/11	13:34	11.98	100.0	Clear	None	6.81	327.0	0.30	55	12.2	-52.5	NA	N/A
03/16/11	13:38	11.98	100.0	Clear	None	6.81	326.1	0.29	50	12.1	-52.7	NA	N/A

Final Pu	urge / S	Sample D	Data										
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (ºC)	ORP (mV)	Salinity (%)	Other
12:08	15:28	200	20.0	Clear	None	6.81	326.1	0.29	50	12.1	-52.7	NA	N/A

	Laboratory Analysis													
ı	Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	<b>COC Notes</b>	Chain No.			
	<b>~</b>	03/16/11	13:40	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-7			

#### **General Notes**

3/16/11 12:00 WATER LEVEL 11.96

Saturated screen volume:

V = (0.163)(Saturated Screen Interval in feet)(Well Radius in inches^2)
V = (0.163)(10)(1^2)
V = 1.63 Gallons (x 3.79 Liters/Gallon) = 6.18 Liters
Total of 3.24 screen volumes purged



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Event: Study Area Screening Evaluation - Site 19

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-SG-MW02A-0708 Lead Sampler: Miki Alroy Sample ID: DSY-SG02A Additional Sampler(s) Johanna Traut Location ID:

QC Duplicate ID: N/A MS/MSD: NA

Sample Data										
Sampling Source	Soil Gas-SG	Sampling Type	Sub-slab							
Top Depth of Probe (ft-bgs)	7	Type of Probe	PRT							
Bottom Depth of Probe(ft-bgs)	8	Diameter of Probe (in)	1.50							

Equipment									
Gauge	Yes	Gauge Serial Number	22509						
Sample Canister	Yes	Sample Canister Serial Number	22509						
Sample Canister Model Number	74375A	Sample Canister Leak Check Date	02/24/11						

Leak Test	Leak Test										
Leak Test Start Date	02/24/2011	Leak Test Start Time	09:45								
Leak Test End Date	02/24/2011	Leak Test End Time	10:00								
Leak Test Duration (min)	14	Leak Test Volume (L)	3.5								
Leak Flow Rate (mL/min)	250.00	Results of Leak Test (ppm-He)	5000								

Sample P	urge Info	rmation					
Date	Time	PID Reading (ppm)	Pressure (in-Hg)	Method	Temp (°C)	Other	Notes
02/24/11	11:05	NA	-26	Low-flow air pump w/Helium leak test	NA	N/A	None
02/24/11	11:10	NA	-23	Low-flow air pump w/Helium leak test		N/A	None
02/24/11	11:15	NA	-19	Low-flow air pump w/Helium leak test		N/A	None
02/24/11	11:20	NA	-15	Low-flow air pump w/Helium leak test		N/A	None
02/24/11	11:25	NA	-11.5	Low-flow air pump w/Helium leak test		N/A	None
02/24/11	11:30	NA	-9.5	Low-flow air pump w/Helium leak test		N/A	None
02/24/11	11:45	NA	-7	Low-flow air pump w/Helium leak test	NA	N/A	None
02/24/11	11:55	NA	-2	Low-flow air pump w/Helium leak test		N/A	checked with standard regulator- flow regulator stopped dropping -standard regulator read -2 in Hg.

<b>Final Purge</b>	Final Purge / Sample Data												
Start Sample Collection (hrs)	End Sample Collection (hrs)	Sample Collection Duration (min)	Sample Collection Volume (L)	Sample Collection Flow Rate (mL/min)	Method	PID Reading (ppm)	Pressure (in Hg)	Temp (°C)	Other				
11:05	11:45	40.0	N/A	0.0	N/A	N/A	N/A	N/A	N/A				

Labo	Laboratory Analysis												
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.			
	02/24/11	11:05	VOCs	TO-15	None	1	SUMMA Canister	6 L	None	ED00000152-5			

# **General Notes**

Allowed 1 hour equilibration time after leak test. PID reading during leak test: 1.1 ppm

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Study Area Screening Evaluation - Site 19 Event:

Newport NS - Site 19 - On-Shore Derecktor Shipyard Site Name:

112G02125.SA.DM (ED00000152) Project No:

DSY-SG-MW03-0608 Lead Sampler: Miki Alroy Sample ID: Location ID: DSY-SG03 Additional Sampler(s) Johanna Traut

QC Duplicate ID: DSY-SG-DUP01-0211 MS/MSD: NA

Sample Data										
Sampling Source	Soil Gas-SG	Sampling Type	Sub-slab							
Top Depth of Probe (ft-bgs)	6.5	Type of Probe	PRT							
Bottom Depth of Probe(ft-bgs)	8	Diameter of Probe (in)	1.50							

Equipment	Equipment										
Gauge	No	Gauge Serial Number	2330								
Sample Canister	Yes	Sample Canister Serial Number	02330								
Sample Canister Model Number	N/A	Sample Canister Leak Check Date	02/24/11								

Leak Test	Leak Test										
Leak Test Start Date	02/24/2011	Leak Test Start Time	14:05								
Leak Test End Date	02/24/2011	Leak Test End Time	14:20								
Leak Test Duration (min)	15	Leak Test Volume (L)	4								
Leak Flow Rate (mL/min)	266.67	Results of Leak Test (ppm-He)	8150								

Sample P	urge Info	rmation					
Date	Time	PID Reading (ppm)	Pressure (in-Hg)	Method	Temp (°C)	Other	Notes
02/24/11	15:30	NA	-25	Low-flow air pump w/Helium leak test	NA	N/A	Duplicate pressure:-25 in Hg.
02/24/11	15:40	NA	-15.5	Low-flow air pump w/Helium leak test		N/A	Duplicate pressure: -16
02/24/11	15:45	NA	-12	Low-flow air pump w/Helium leak test		N/A	Duplicate pressure: - 12
02/24/11	15:50	NA	-9	Low-flow air pump w/Helium leak test	NA	N/A	Duplicate pressure: -9
02/24/11	15:55	NA	-7	Low-flow air pump w/Helium leak test		N/A	Duplicate pressure: -7
02/24/11	16:00	NA	-5	Low-flow air pump w/Helium leak test		N/A	Duplicate pressure: -5
02/24/11	16:05	NA	-4	Low-flow air pump w/Helium leak test		N/A	DUplicate pressure: -4

<b>Final Purge</b>	Final Purge / Sample Data												
Start Sample Collection (hrs)	End Sample Collection (hrs)	Sample Collection Duration (min)	Sample Collection Volume (L)	Sample Collection Flow Rate (mL/min)	Method	PID Reading (ppm)	Pressure (in Hg)	Temp (°C)	Other				
15:30	16:05	35.0	N/A	0.0	N/A	N/A	N/A	N/A	N/A				

Labo	Laboratory Analysis											
Coll.	Time	Description	Preservative	No.	Туре	Vol.	<b>COC Notes</b>	Chain No.				
<b>~</b>	02/24/11	15:30	VOCs	TO-15	None	1	SUMMA Canister	6 L	None	ED00000152-5		

# **General Notes**

PID reading during leak test=0.5ppm Duplicate gauge number:24220 Duplicate canister number: 24220 Checked: 2/24/11 Started sample collection at 1520

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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-SG-MW11A-0203 Lead Sampler: Miki Alroy Location ID: DSY-SG11A Additional Sampler(s) N/A QC Duplicate ID: N/A MS/MSD: NA

Sample Data										
Sampling Source	Soil Gas-SG	Sampling Type	Sub-slab							
Top Depth of Probe (ft-bgs)	5	Type of Probe	PRT							
Bottom Depth of Probe(ft-bgs)	6	Diameter of Probe (in)	1.50							

Equipment										
Gauge	Yes	Gauge Serial Number	4184							
Sample Canister	Yes	Sample Canister Serial Number	4184							
Sample Canister Model Number	24174	Sample Canister Leak Check Date	02/22/11							

Leak Test	Leak Test										
Leak Test Start Date	03/03/2011	Leak Test Start Time	11:00								
Leak Test End Date	03/03/2011	Leak Test End Time	11:15								
Leak Test Duration (min)	15	Leak Test Volume (L)	3.5								
Leak Flow Rate (mL/min)	233.33	Results of Leak Test (ppm-He)	1000								

Sample P	Sample Purge Information											
Date	Time	PID Reading (ppm)	Pressure (in-Hg)	Method	Temp (°C)	Other	Notes					
03/03/11	12:20	NA	-30	Low-flow air pump w/Helium leak test		N/A	None					
03/03/11	12:30	NA	-22	Low-flow air pump w/Helium leak test		N/A	None					
03/03/11	12:40	NA	-13.5	Low-flow air pump w/Helium leak test		N/A	None					
03/03/11	12:50	NA	-7.5	Low-flow air pump w/Helium leak test		N/A	None					

<b>Final Purge</b>	Final Purge / Sample Data												
Start Sample Collection (hrs)	End Sample Collection (hrs)	Sample Collection Duration (min)	Sample Collection Volume (L)	Sample Collection Flow Rate (mL/min)	Method	PID Reading (ppm)	Pressure (in Hg)	Temp (°C)	Other				
12:20	12:50	30.0	6	200.0	Low-flow air pump w/Helium leak test		-7.5	-3	N/A				

Labo	Laboratory Analysis														
Coll.	Date	Date Time Description Analysis				No.	Type	Vol.	COC Notes	Chain No.					
	03/03/11	12:20	VOCs	TO-15	None	1	SUMMA Canister	6 L	None	ED00000152-5					

General Notes	
None	

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DSY-SG-MW12-0506 Lead Sampler: Miki Alroy Location ID: DSY-SG12 Additional Sampler(s) N/A QC Duplicate ID: N/A MS/MSD: NA

Sample Data											
Sampling Source	None	Sampling Type	None								
Top Depth of Probe (ft-bgs)	0	Type of Probe	None								
Bottom Depth of Probe(ft-bgs)	0	Diameter of Probe (in)	None								

Equipment										
Gauge	Yes	Gauge Serial Number	35150							
Sample Canister	Yes	Sample Canister Serial Number	35150							
Sample Canister Model Number	2303	Sample Canister Leak Check Date	02/22/11							

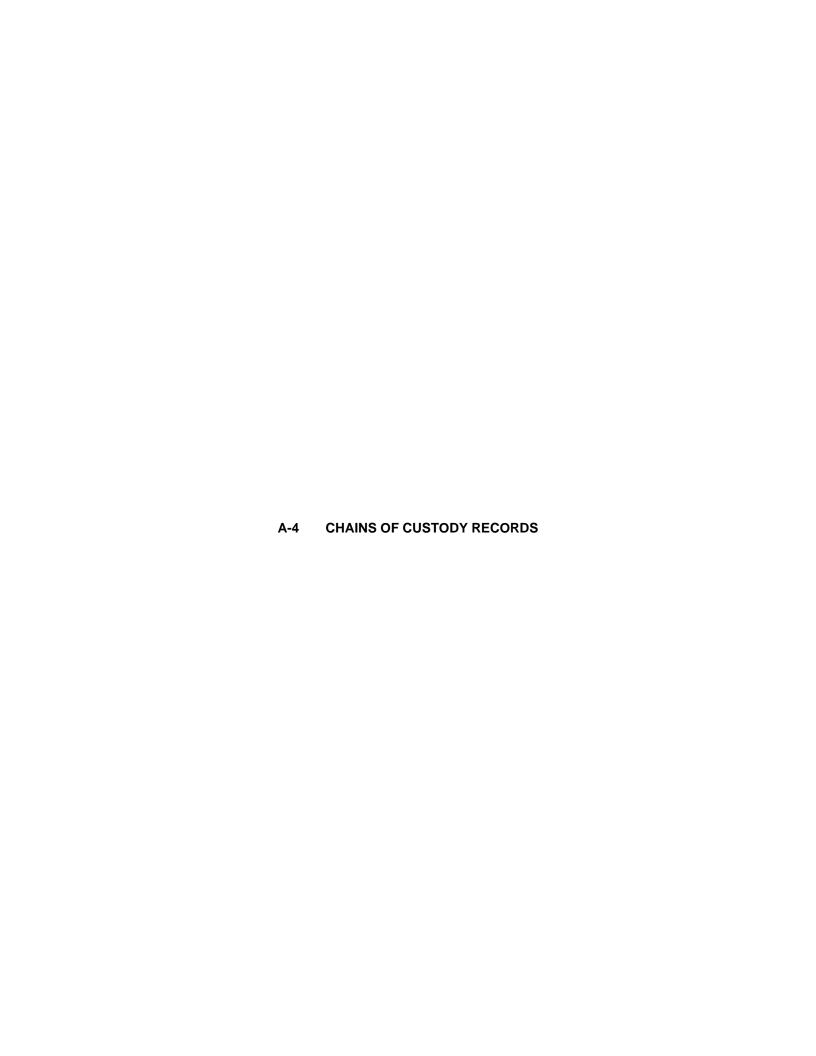
Leak Test											
Leak Test Start Date	03/03/2011	Leak Test Start Time	14:00								
Leak Test End Date	03/03/2011	Leak Test End Time	14:15								
Leak Test Duration (min)	15	Leak Test Volume (L)	3								
Leak Flow Rate (mL/min)	200.00	Results of Leak Test (ppm-He)	900								

Sample P	Sample Purge Information												
Date	Time	PID Reading (ppm)	Pressure (in-Hg)	Method	Temp (°C)	Other	Notes						
03/03/11	15:19	NA	-28	Low-flow air pump w/Helium leak test		N/A	None						
03/03/11	15:29	NA	-22	Low-flow air pump w/Helium leak test		N/A	None						
03/03/11	15:39	NA	-13	Low-flow air pump w/Helium leak test	-3	N/A	None						
03/03/11	15:49	NA	-7	Low-flow air pump w/Helium leak test		N/A	None						

<b>Final Purge</b>	Final Purge / Sample Data												
Start Sample Collection (hrs)	End Sample Collection (hrs)	Sample Collection Duration (min)	Sample Collection Volume (L)	Sample Collection Flow Rate (mL/min)	Method	PID Reading (ppm)	Pressure (in Hg)	Temp (°C)	Other				
15:19	15:49	30.0	6	200.0	Low-flow air pump w/Helium leak test		-7	-3	N/A				

Labo	aboratory Analysis												
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.			
<b>~</b>	03/03/11	15:19	VOCs	TO-15	None	1	SUMMA Canister	6 L	None	ED00000152-5			

General Notes	
None	





CHAIN OF CUSTODY NUMBER: ED00000152-1

Project No: 112G02125	Facility: Newport NS	Project Manager: Thomas Campbell	Carrier: Federal Express	Laboratory Name: Empirical Laboratories, LLC
	·	·		621 Mainstream Drive Nashville, TN 37228
Task No:	Turn Around Time:	Field Ops Leader:	Carrier/Waybill No.	Point of Contact:
WE20	Standard	Miki Alroy	TBD	Kim Kostzer
				615.345.1115 ext. 240

Date	Sample ID#	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
02/09/2011	DSY-SB202-SO-0204	13:45	SW-846 8270C	DSY-SB202	so	PAHs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/09/2011	DSY-SB202-SO-0204	13:45	SW-846 6010B	DSY-SB202	so	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/11/2011	DSY-SB201-SO-0204	08:35	SW-846 8270C	DSY-SB201	so	PAHs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/11/2011	DSY-SB201-SO-0204	08:35	SW-846 6010B	DSY-SB201	so	Metals	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/11/2011	DSY-SB204-SO-0810	12:10	SW-846 8270C	DSY-SB204	so	PAHs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/11/2011	DSY-SB204-SO-0810	12:10	SW-846 6010B	DSY-SB204	so	Metals	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/11/2011	DSY-SB204-SO-0810	12:10	SW-846 8260B	DSY-SB204	so	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/11/2011	DSY-SB204-SO-0810	12:10	Percent Moisture	DSY-SB204	so	Percent Moisture for VOCs	None	1	Glass - Clear	2 oz. wide-mouth w/Teflon cap	
02/11/2011	DSY-SB204-SO-0810	12:10	SW-846 8015B.	DSY-SB204	so	DRO	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/11/2011	DSY-SB204-SO-0810	12:10	SW-846 8015B	DSY-SB204	so	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/11/2011	DSY-SO-TB01-021111	07:00	SW-846 8260B	QC	AQ	VOCs	4°C/MeOH	1	Glass - Clear	40ml vials	
02/11/2011	DSY-SO-TB01-021111	07:00	SW-846 8015B	QC	AQ	GRO	4°C/MeOH	1	Glass - Clear	40ml vials	
02/11/2011	DSY-SO-TB01-021111	07:00	SW-846 8260B	QC	AQ	VOCs	4°C/NaHSO4+5mIDI	1	Glass - Clear	40ml vials	
02/14/2011	DSY-SB204-SO-0002	14:00	SW-846 8260B	DSY-SB204	so	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/14/2011	DSY-SB204-SO-0002	14:00	Percent Moisture	DSY-SB204	so	Percent Moisture for VOCs	None	1	Plastic - PE	4 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SB204-SO-0002	14:00	SW-846 8270C	DSY-SB204	so	PAHs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SB204-SO-0002	14:00	SW-846 8015B	DSY-SB204	so	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/14/2011	DSY-SB204-SO-0002	14:00	SW-846 6010B	DSY-SB204	so	Metals	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SB204-SO-0002	14:00	SW-846 8015B.	DSY-SB204	so	DRO	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SB206-SO-0002	14:30	SW-846 8260B	DSY-SB206	so	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/14/2011	DSY-SB206-SO-0002	14:30	Percent Moisture	DSY-SB206	so	Percent Moisture for VOCs	None	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SB206-SO-0002	14:30	SW-846 8270C	DSY-SB206	so	PAHs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SB206-SO-0002	14:30	SW-846 8015B	DSY-SB206	so	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/14/2011	DSY-SB206-SO-0002	14:30	SW-846 6010B	DSY-SB206	so	Metals	4℃	1		4 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SB206-SO-0002	14:30	SW-846 8015B.	DSY-SB206	so	DRO	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SB206-SO-0810	14:55	SW-846 8260B	DSY-SB206	so	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/14/2011	DSY-SB206-SO-0810	14:55	Percent Moisture	DSY-SB206	so	Percent Moisture for VOCs	None	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SB206-SO-0810	14:55	SW-846 8270C	DSY-SB206	so	PAHs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	

02/14/2011 DSY-SB206-SO-0810	14:55	SW-846 8015B	DSY-SB206 SC	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/14/2011 DSY-SB206-SO-0810	14:55	SW-846 6010B	DSY-SB206 SC	Metals	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/14/2011 DSY-SB206-SO-0810	14:55	SW-846 8015B.	DSY-SB206 SC	DRO	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/14/2011 DSY-SO-DUP01-021411	00:00	SW-846 8270C/8015B	QC SC	PAHs/DRO	4℃	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	2 jars for each PAHs and DRO
02/14/2011 DSY-SO-DUP01-021411	00:00	SW-846 8260B	QC SC	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/14/2011 DSY-SO-DUP01-021411	00:00	Percent Moisture	QC SC	Percent Moisture for VOCs	None	1	Plastic - PE	4 oz. wide-mouth w/Teflon cap	
02/14/2011 DSY-SO-DUP01-021411	00:00	SW-846 8015B	QC SC	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/14/2011 DSY-SO-DUP01-021411	00:00	SW-846 6010B	QC SC	Metals	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB205-SO-0002	12:10	SW-846 8260B	DSY-SB205 SC	VOCs	4°C/MeOH+DI Combo	9	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011 DSY-SB205-SO-0002	12:10	Percent Moisture	DSY-SB205 SC	Percent Moisture for VOCs	None	3	Glass - Clear	2 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB205-SO-0002	12:10	SW-846 8015B.	DSY-SB205 SC	DRO	4℃	3	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB205-SO-0002	12:10	SW-846 6010B	DSY-SB205 SC	Metals	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB205-SO-0002	12:10	SW-846 8015B	DSY-SB205 SC	GRO	4°C/MeOH	3	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011 DSY-SB205-SO-0002	12:15	SW-846 8270C	DSY-SB205 SC	PAHs	4°C	3	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB205-SO-088.5	12:30	SW-846 8260B	DSY-SB205 SC	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011 DSY-SB205-SO-088.5	12:30	Percent Moisture	DSY-SB205 SC	Percent Moisture for VOCs	None	1	Glass - Clear	2 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB205-SO-088.5	12:30	SW-846 8270C	DSY-SB205 SC	PAHs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB205-SO-088.5	12:30	SW-846 6010B	DSY-SB205 SC	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB205-SO-088.5	12:30	SW-846 8015B	DSY-SB205 SC	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011 DSY-SB205-SO-088.5	12:30	SW-846 8015B.	DSY-SB205 SC	DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB207-SO-0002	09:05	SW-846 8260B	DSY-SB207 SC	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011 DSY-SB207-SO-0002	09:05	Percent Moisture	DSY-SB207 SC	Percent Moisture for VOCs	None	1	Glass - Clear	2 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB207-SO-0002	09:05	SW-846 8270C	DSY-SB207 SC	PAHs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB207-SO-0002	09:05	SW-846 6010B	DSY-SB207 SC	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB207-SO-0002	09:05	SW-846 8015B	DSY-SB207 SC	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011 DSY-SB207-SO-0002	09:05	SW-846 8015B.	DSY-SB207 SC	DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB207-SO-1012	09:35	SW-846 8260B	DSY-SB207 SC	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011 DSY-SB207-SO-1012	09:35	Percent Moisture	DSY-SB207 SC	Percent Moisture for VOCs	None	1	Glass - Clear	2 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB207-SO-1012	09:35	SW-846 8270C	DSY-SB207 SC	PAHs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB207-SO-1012	09:35	SW-846 6010B	DSY-SB207 SC	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011 DSY-SB207-SO-1012	09:35	SW-846 8015B	DSY-SB207 SC	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011 DSY-SB207-SO-1012	09:35	SW-846 8015B.	DSY-SB207 SC	DRO	4°C	1		4 oz. wide-mouth w/Teflon cap	

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Miki Alroy	02/15/2011	16:27	Federal Express	02/15/2011	17:27
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:



CHAIN OF CUSTODY NUMBER: ED00000152-2

Project No: <b>112G02125</b>	Facility: Newport NS	Project Manager: Thomas Campbell		Laboratory Name: Empirical Laboratories, LLC 621 Mainstream Drive Nashville, TN 37228
Task No: WE20	Turn Around Time: Standard	Field Ops Leader: Miki Alroy	Carrier/Waybill No.	Point of Contact: Kim Kostzer 615.345.1115 ext. 240

Date	Sample ID#	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
02/24/2011	DSY-GW-MW02A-022411	12:15	SW-846 8260B	DSY-MW02A	GW	VOCs	4℃/HCL	3	Glass - Clear	40ml vials	
02/24/2011	DSY-GW-MW03-022411	15:10	SW-846 8260B	DSY-MW03	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
02/24/2011	DSY-GW-TB01-022411	08:00	SW-846 8260B	QC	AQ	VOCs	4℃/HCL	2	Glass - Clear	40ml vials	

Time:	Date:	Received By:	Time:	Date:	1. Relinquished By:
5/2011 18:30	02/25/2011	Federal Express	18:30	02/25/2011	Miki Alroy
Time:	Date:	Received By:	Time:	Date:	2. Relinquished By:
Time:	Date:	Received By:	Time:	Date:	3. Relinquished By:
Time:	Date:	Received By:	Time:	Date:	3. Relinquished By:



CHAIN OF CUSTODY NUMBER: ED00000152-3

Project No:	Facility:	Project Manager:	Carrier:	Laboratory Name:
112G02125	Newport NS	Thomas Campbell	•	Empirical Laboratories, LLC
				621 Mainstream Drive Nashville, TN 37228
		F: 11.0		
Task No:	Turn Around Time:	Field Ops Leader:	Carrier/Waybill No.	Point of Contact:
WE20	Standard	Miki Alroy		Kim Kostzer
				615.345.1115 ext. 240

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
02/22/2011	DSY-SO-DUP01-022211	00:00	SW-846 8082	QC	so	PCBs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/22/2011	DSY-SO-SB215-000.5	15:00	SW-846 8082	DSY-SB215	so	PCBs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/22/2011	DSY-SO-SB216-000.5	15:35	SW-846 8082	DSY-SB216	so	PCBs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/22/2011	DSY-SO-SB217-000.5	15:40	SW-846 8082	DSY-SB217	so	PCBs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/22/2011	DSY-SO-SB224-000.5	16:05	SW-846 8082	DSY-SB224	so	PCBs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-DUP02-0211	00:00	SW-846 8082	QC	so	PCBs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-DUP02-0211	00.00	Percent Moisture.	QC	SO	Percent Moisture for GRO	4℃	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
	DSY-SO-DUP02-0211	_	SW-846 8015B	QC	_	GRO	4°C/MeOH			40 mL vial (pre-tared)	
02/25/2011	DSY-SO-DUP02-0211	00:00	SW-846 8270C/8015B	OC	SO	PAHs/DRO	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
	DSY-SO-DUP02-0211		SW-846 6010B	QC	-	Metals	4℃			4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB208-000.5	14:05	SW-846 8270C/8015B	DSV-SB208	SO	PAHs/DRO	4°C	1	Glass - Ambor	4 oz. wide-mouth w/Teflon cap	
	DSY-SO-SB208-000.5		SW-846 8082	DSY-SB208		PCBs				4 oz. wide-mouth w/Teflon cap	Run MS/MSD
	DSY-SO-SB208-000.5		SW-846 6010B	DSY-SB208		Metals	4℃			4 oz. wide-mouth w/Teflon cap	TUTT WIO/WIOD
	DSY-SO-SB208-000.5		Percent Moisture.	DSY-SB208		Percent Moisture for GRO		1		2 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB208-000.5	14:05	SW-846 8015B	DSY-SB208	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
	DSY-SO-SB209-0.30.7		SW-846 8082	DSY-SB209	_	PCBs	4℃			4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB209-0.30.7	10:05	SW-846 8270C/8015B	DSY-SB209	SO	PAHs/DRO	4°C			4 oz. wide-mouth w/Teflon cap	
	DSY-SO-SB209-0.30.7	_	SW-846 6010B	DSY-SB209		Metals	4℃			4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB209-0.30.7	10:05	Percent Moisture.	DSY-SB209		Percent Moisture for GRO	1.0℃	1		2 oz. wide-mouth w/Teflon cap	
	DSY-SO-SB209-0.30.7		SW-846 8015B	DSY-SB209	_	GRO	4°C/MeOH	1		40 mL vial (pre-tared)	
						PAHs/DRO				" /	
	DSY-SO-SB210-0102 DSY-SO-SB210-0102		SW-846 8270C/8015B SW-846 8082	DSY-SB210 DSY-SB210		PCBs	4℃ 4℃			4 oz. wide-mouth w/Teflon cap 4 oz. wide-mouth w/Teflon cap	
										'	
	DSY-SO-SB210-0102		SW-846 6010B	DSY-SB210		Metals	4℃	1		4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB210-0102	12:35	Percent Moisture.	DSY-SB210	so	Percent Moisture for GRO	4℃	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB210-0102	12:35	SW-846 8015B	DSY-SB210	so	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011	DSY-SO-SB211-0102	13:35	SW-846 8270C/8015B	DSY-SB211	so	PAHs/DRO	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB211-0102	13:35	SW-846 8082	DSY-SB211	so	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB211-0102	13:35	SW-846 6010B	DSY-SB211	so	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB211-0102	13:35	Percent Moisture.	DSY-SB211	SO	Percent Moisture for GRO	4℃	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	

02/25/2011 DSY-SO-SB211-010	2  13:35	SW-846 8015B	DSY-SB211	so	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011 DSY-SO-SB212-020	4 15:00	Percent Moisture.	DSY-SB212	so	Percent Moisture for GRO	4°C	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB212-020	4 15:00	SW-846 8082	DSY-SB212	so	PCBs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB212-020	4 15:00	SW-846 6010B	DSY-SB212	SO	Metals	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB212-020	4 15:00	SW-846 8015B	DSY-SB212	so	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011 DSY-SO-SB212-020	4 15:00	SW-846 8270C/8015B	DSY-SB212	so	PAHs/DRO	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB213-020	3 13:25	SW-846 8270C/8015B	DSY-SB213	so	PAHs/DRO	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB213-020	3 13:25	SW-846 8082	DSY-SB213	SO	PCBs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB213-020	3 13:25	SW-846 6010B	DSY-SB213	so	Metals	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB213-020	3 13:25	Percent Moisture.	DSY-SB213	so	Percent Moisture for GRO	4℃	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB213-020	3 13:25	SW-846 8015B	DSY-SB213	so	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011 DSY-SO-SB214-020	3 13:40	SW-846 8270C/8015B	DSY-SB214	so	PAHs/DRO	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB214-020	3 13:40	SW-846 8082	DSY-SB214	so	PCBs	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB214-020	3 13:40	SW-846 6010B	DSY-SB214	SO	Metals	4℃	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB214-020	3 13:40	Percent Moisture.	DSY-SB214	so	Percent Moisture for GRO	4℃	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/25/2011 DSY-SO-SB214-020	3 13:40	SW-846 8015B	DSY-SB214	so	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011 DSY-SO-TB02-0225	11 08:00	SW-846 8015B	QC	AQ	GRO	4°C/MeOH	2	Glass - Clear	40ml vials	Trip blank for soils

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Miki Alroy	02/25/2011	18:30	Federal Express	02/25/2011	18:30
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
			I		
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:



CHAIN OF CUSTODY NUMBER: ED00000152-4

Project No	:	Facility:		Project Mana	ger:	Carrie	r:	Laborato	y Name:	
112G0212	25	Newport NS		Thomas Car	npbell	Feder	al Express	Empirica	l Laboratories,	LLC
					•		-	621 Mai	nstream Drive	
								Nashvill	e, TN 37228	
Task No:		Turn Around Time	e:	Field Ops Lea	der:	Carrie	r/Waybill No.	Point of C	Contact:	
WE20		Standard		Miki Alroy				Kim Kos	tzer	
								615.345	.1115 ext. 240	
						•		-		

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
02/26/2011	DSY-GW-DUP01-0211	00:00	SW-846 8260B	QC	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
02/26/2011	DSY-GW-MW11A-022611	13:10	SW-846 8260B	DSY-MW11A	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
02/26/2011	DSY-GW-TB01-030111	08:00	SW-846 8260B	QC	AQ	VOCs	4°C/HCL	2	Glass - Clear	40ml vials	
03/01/2011	DSY-GW-MW08-030111	11:35	SW-846 8260B	DSY-MW08	GW	VOCs	4℃/HCL	9	Glass - Clear	40ml vials	Run MS/MSD
03/01/2011	DSY-GW-MW08-030111	11:35	SW-846 8270C SIM	DSY-MW08	GW	PAHs	4℃	6	Glass - Amber	1L	Run MS/MSD
03/01/2011	DSY-GW-MW08-030111	11:35	SW-846 6010B	DSY-MW08	GW	Metals (Total)	4°C/HNO3	2	Plastic - PE	250ml	Run MS/MSD
03/01/2011	DSY-GW-MW08-030111	11:35	SW-846 6010B (Field-Filtered)	DSY-MW08	GW	Metals (Dissolved)	4°C/HNO3	2	Plastic - PE	250ml	Run MS/MSD
03/01/2011	DSY-GW-MW218-030111	14:00	SW-846 8260B	DSY-MW218	GW	VOCs	4℃/HCL	3	Glass - Clear	40ml vials	
03/01/2011	DSY-GW-MW218-030111	14:00	SW-846 8270C SIM	DSY-MW218	GW	PAHs	4℃	2	Glass - Amber	1L	
03/01/2011	DSY-GW-MW218-030111	14:00	SW-846 6010B	DSY-MW218	GW	Metals (Total)	4°C/HNO3	1	Plastic - PE	250ml	
03/01/2011	DSY-GW-MW218-030111	14:00	SW-846 6010B (Field-Filtered)	DSY-MW218	GW	Metals (Dissolved)	4°C/HNO3	1	Plastic - PE	250ml	
03/01/2011	DSY-GW-MW220-030111	11:45	SW-846 8260B	DSY-MW220	GW	VOCs	4℃/HCL	3	Glass - Clear	40ml vials	
03/02/2011	DSY-GW-MW221-030211	13:40	SW-846 8260B	DSY-MW221	GW	VOCs	4℃/HCL	3	Glass - Clear	40ml vials	
03/02/2011	DSY-GW-MW222-030211	11:15	SW-846 8260B	DSY-MW222	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Miki Alroy	03/02/2011	16:00	Federal Express	03/02/2011	16:00
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
					i
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:



CHAIN OF CUSTODY NUMBER: ED00000152-5

Project No:	Facility:	Project Manager:	Carrier:	Laboratory Name:
112G02125	Newport NS	Thomas Campbell	Federal Express	Air Toxics Ltd.
			_	180 Blue Ravine Rd.
				Folsom, CA 95630
Task No:	Turn Around Time:	Field Ops Leader:	Carrier/Waybill No.	Point of Contact:
WE20	Standard	Miki Alroy	TBD	Ausha Scott
				916-605-3344 (Direct Line/Fax)

Date	Sample ID#	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
02/24/2011	DSY-SG-DUP01-0211	00:00	TO-15	QC	SG	VOCs	None	1	SUMMA Canister	6 L	
02/24/2011	DSY-SG-MW02A-0708	11:05	TO-15	DSY-SG02A	SG	VOCs	None	1	SUMMA Canister	6 L	
02/24/2011	DSY-SG-MW03-0608	15:30	TO-15	DSY-SG03	SG	VOCs	None	1	SUMMA Canister	6 L	
03/03/2011	DSY-SG-MW11A-0203	12:20	TO-15	DSY-SG11A	SG	VOCs	None	1	SUMMA Canister	6 L	
03/03/2011	DSY-SG-MW12-0506	15:19	TO-15	DSY-SG12	SG	VOCs	None	1	SUMMA Canister	6 L	

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Miki Alroy	03/09/2011	16:00	Federal Express	03/09/2011	16:00
<ol><li>Relinquished By:</li></ol>	Date:	Time:	Received By:	Date:	Time:
<ol><li>Relinquished By:</li></ol>	Date:	Time:	Received By:	Date:	Time:



CHAIN OF CUSTODY NUMBER: ED00000152-6

Project No:	Facility:	Project Manager:	Carrier:	Laboratory Name:
112G02125	Newport NS	Thomas Campbell	Federal Express	Empirical Laboratories, LLC
				621 Mainstream Drive
				Nashville, TN 37228
Task No:	Turn Around Time:	Field Ops Leader:	Carrier/Waybill No.	Point of Contact:
WE20	Standard	Miki Alroy	TBD	Kim Kostzer
				615.345.1115 ext. 240

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
03/03/2011	DSY-GW-MW12-030311	14:26	SW-846 8260B	DSY-MW12	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 8270C SIM	QC	AQ	PAHs	4℃	2	Glass - Amber	1L	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 8260B	QC	AQ	VOCs	4℃/HCL	3	Glass - Clear	40ml vials	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 6010B	QC	AQ	Metals (Total)	4°C/HNO3	1	Plastic - PE	250ml	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 8082	QC	AQ	PCBs	4℃	2	Glass - Amber	1L	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 8015B	QC	AQ	GRO	4°C/HCL	3	Glass - Clear	40ml vials	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 8015B	QC	AQ	DRO	4℃/HCL	2	Glass - Amber	1L	
03/08/2011	DYS-GW-TB01-030311	08:00	SW-846 8260B	QC	AQ	VOCs	4℃/HCL	1	Glass - Clear	40ml vials	
03/08/2011	DYS-GW-TB01-030311	08:00	SW-846 8015B	QC	AQ	GRO	4°C/HCL	1	Glass - Clear	40ml vials	

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Miki Alroy	03/09/2011	16:00	Federal Express	03/09/2011	16:00
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
			·		
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:



CHAIN OF CUSTODY NUMBER: ED00000152-7

Project No: 112G02125	,	Project Manager: Thomas Campbell	Carrier: Federal Express	Laboratory Name: Empirical Laboratories, LLC 621 Mainstream Drive Nashville, TN 37228
Task No: <b>WE20</b>		Field Ops Leader: Miki Alroy	Carrier/Waybill No.	Point of Contact: Kim Kostzer 615.345.1115 ext. 240

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Regs	Comments
03/16/2011	DSY-GW-DUP02- 031611	00:00	SW-846 8260B	QC	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/16/2011	DSY-GW-DUP02- 031611		SW-846 6010B (Field- Filtered)	QC	GW	Metals (Dissolved)	4° C/HNO3	1	Plastic - PE	250ml	
03/16/2011	DSY-GW-DUP02- 031611	00:00	SW-846 8270C SIM	QC	GW	PAHs	4°C	2	Glass - Amber	1L	
03/16/2011	DSY-GW-DUP02- 031611	00:00	SW-846 6010B	QC	GW	Metals (Total)	4° C/HNO3	1	Plastic - PE	250ml	
03/16/2011	DSY-GW-MW219- 031611	10:12	SW-846 8260B	DSY- MW219	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/16/2011	DSY-GW-MW219- 031611	10:12	SW-846 8270C SIM	DSY- MW219	GW	PAHs	4°C	2	Glass - Amber	1L	
03/16/2011	DSY-GW-MW219- 031611	10:12	SW-846 6010B	DSY- MW219	GW	Metals (Total)	4° C/HNO3	1	Plastic - PE	250ml	
03/16/2011	DSY-GW-MW219- 031611	10:12	SW-846 6010B (Field- Filtered)	DSY- MW219	GW	Metals (Dissolved)	4° C/HNO3	1	Plastic - PE	250ml	
03/16/2011	DSY-GW-MW223- 031611	13:40	SW-846 8260B	DSY- MW223	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
		15:23	SW-846 6010B (Field- Filtered)	QC	AQ	Metals (Dissolved)	4° C/HNO3	1	Plastic - PP	250ml	
03/16/2011			SW-846 8260B	QC	AQ	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	SAMPLE COLLECTED FROM NEW TUBING AND TEFLON BLADDER
03/16/2011	DSY-GW-RB01-031611	15:23	SW-846 6010B	QC	AQ	Metals (Total)	4° C/HNO3	1	Plastic - PP	250ml	
03/16/2011	DSY-GW-RB01-031611	15:23	SW-846 8270C SIM	QC		PAHs	4℃	2	Glass - Amber	1L	
03/16/2011	DSY-GW-TB01-031611	07:00	SW-846 8260B	QC	AQ	VOCs	4°C/HCL	2	Glass - Clear	40ml vials	
03/17/2011	DSY-GW-MW204- 031711	10:49	SW-846 8260B	DSY- MW204	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/17/2011	DSY-GW-MW204- 031711	10:49	SW-846 8270C SIM	DSY- MW204	GW	PAHs	4℃	2	Glass - Amber	1L	
	DSY-GW-MW204- 031711	10:49	SW-846 6010B	DSY- MW204	GW	Metals (Total)	4° C/HNO3	1	Plastic - PE	250ml	
03/17/2011	DSY-GW-MW204- 031711	10:49	SW-846 6010B (Field- Filtered)	DSY- MW204	GW	Metals (Dissolved)	4° C/HNO3	1	Plastic - PE	250ml	

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Miki Alroy	03/18/2011	18:00	Federal Express	03/18/2011	18:00
<ol><li>Relinquished By:</li></ol>	Date:	Time:	Received By:	Date:	Time:
<ol><li>Relinquished By:</li></ol>	Date:	Time:	Received By:	Date:	Time:
Comments:					

A-5 FIELD EQUIPMENT CALIBRATION LOG SHEETS

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# PHOTOIONIZATION DETECTOR FIELD CALIBRATION LOG

	-03 Q5 n: On-Shore Derecktor Shipyard	Model No.: 10 M		Decal No.: Tetra Tech NUS Charge No.: _´	112G02125
CALIBRATION DATE	STANDARD GAS- ISOBUTYLENE	CALIBRATION READING Isobutylene Equiv. (ppm)	PM CALIBRATION CHECK Isobutylene Equiv. (ppm)	SIGNATURE	COMMENTS
28/11	Lot # ppm	93.1		Rue	Not used
2/11/11	Lot# LT (= 250 MD - CM) Conc. = 100 ppm	99.6		A	NotUsed
2/14/11	Lot#ppm	96.1	91.3	Killer,	
2/15/11	Lot # ppm	102	10.1	AM P. Syl	
2/16	Lot # ppm.	105	102	Rive	1
2/17	Lot#ppm	0.0/100	88.7	AM PS PAN PS	
2/18	Lot#ppm	0.0/102	0.03/100	AM 75 PM AC	
2/21	Lot#ppm	0.0/102	0.0/94.0	AM PS	
THUS Form 0006	Lot # ppm				

# A TECH NUS, INC.

# PHOTOIONIZATION DETECTOR FIELD CALIBRATION LOG on 2/1/1/

Serial No.: Site Name/Location	5566 On-Shore Derecktor Shipyard	Model No.:	N	Decal No.: Tetra Tech NUS Charge No.: _	
CALIBRATION DATE	STANDARD GAS- ISOBUTYLENE	CALIBRATION READING Isobutylene Equiv. (ppm)	CALIBRATION CHECK Isobutylene Equiv. (ppm)	SIGNATURE	COMMENTS
2/8/11	Lot#	99.3	99.8	300	
2/9/11	Lot # ppm	95.5	104.7	alex	
2/10/11	Lot # ppm	99.5	100.2	Rone	
2/11/11	Lot # ppm	102.9 -			> cleaned laup.
2/11/11	Lot # ppm	101. Ce	90.2	265	day end-outside of acceptable rough
	Lot # Conc. = ppm	0.3/101.5		AU P.S.	Did not use
	Lot # ppm				
	Lot # ppm				
Thills Form 0006	Lot #ppm				

ITNUS Form 0006

Orange	YID
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TETR/	A TECH NUS, INC.	PHOTOI	ONIZATION DETE	CTOR FIELD CALIB	RATION LOG
Serial No.: Site Name/Location	on-Shore Derecktor Shipyard		n Tiger	Decal No.:  Tetra Tech NUS Charge No.: _1	12G02125
CALIBRATION DATE	STANDARD GAS- ISOBUTYLENE	CALIBRATION READING Isobutylene Equiv. (ppm)	CALIBRATION CHECK Isobutylene Equiv. (ppm)	SIGNATURE	COMMENTS
2/14/11	Lot # <u>LT 6250 - M 0 - C</u> r Conc. = <u>100</u> ppm	1 97.0	95.8	Kme	
215	Lot #ppm	100.2	90.4	Ruez	9
2/16	Lot #ppm	102.0	90.5	RMC	
2/17	Lot #ppm		95.9	RINC	
2/18	Lot #ppm	100,3		MA	105. 2 5
2/21	Lot #ppm	0.3/101.5	96.4	AM PS PM PS	
2/24	Lot #ppm	0.0/99.2	160:1	AM AC PM M14	
2 25	Lot # ppm	0.0/96.1	92.9	AM ADC	
2/26	Lot # ppm	0.0/ 99.2	97.7	APC	
TtNU\$ Form 0006		/ <sub>=</sub> =	,		

MIA Equipment

Orange 1	IP
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TE TETR	A TECH NUS, INC.	РНОТОІ	ONIZATION DETE	CTOR FIELD CALIB	RATION LOG
Serial No.: Site Name/Location	105454 n: On-Shore Derecktor Shipyard	Model No.:	"	Decal No.: Tetra Tech NUS Charge No.: _	112G02125
CALIBRATION DATE	STANDARD GAS- ISOBUTYLENE	CALIBRATION READING Isobutylene Equiv. (ppm)	CALIBRATION CHECK Isobutylene Equiv. (ppm)	SIGNATURE	COMMENTS
3/1	Lot # <u>LT 6 750 - WO-CM</u> Conc. = <u>100</u> ppm	0.0/99.4	103.8	3	
3/2	Lot #ppm	0.0/100.2	100.8	M. Afrais	
3/3	Lot #ppm	0.0 /103.6	103.6	1	A
3/4	Lot #	0.0/108.7	100.3	M. Adam	
3/7	Lot #ppm	0.0/[13.]	109.1	400	
3/8	Lot #ppm	0.0/101.5	114.7	Toriandes	
	Lot #ppm				
	Lot # ppm				

Conc. = \_\_\_\_\_

Reading Check / S Signature Date 0.0/9212 0.0/100 101 110

Serial No.: On-Shore Derecktor Shipyard February 2011  Job No.: 112G0  On-Shore Derecktor Shipyard February 2011  Job No.: 112G0  Instrument is calibrated in accordance with Manufacturer's Instructions  DATE: 2   4 Pre Calibration Readings Post Calibration Readings PM Check Cal  Cond. mS/cm  PH=4.0  PH=7.0  PH=10.0  D.O. mg/l  REDOX mV  Turbidity 100 NTUs  Temp 'C  Salinity 0/00	ration STDs (lot #s)  Signature  Remarks  4 Conductance Instead  of SPC2
DATE: 2 14 Pre Calibration Readings Post Calibration Readings PM Check Cal 704* 994 95.1  pH=4.0  pH=7.0  pH=10.0  D.O. mg/l  REDOX mV  Turbidity 100 NTUs  Temp 'C  Salinity 0/00	TREAD TO STUDY (10145) SIGNALUTE  At Conductance instead of SPC2
Cond. mS/cm  704* 994 1.05 pH=4.0 pH=7.0 pH=10.0 pH=10.0 p.O. mg/l REDOX mV Turbidity 0 NTUs Turbidity 100 NTUs Temp 'C Salinity 0/00	1/2 FAVE 493 106/15
DATE: 27/16	1/2 FAVE 493 1016/12
pH=7.0 pH=10.0 pH=10.0 p.O. mg/l  REDOX mV  Turbidity 100 NTUs  Temp 'C Salinity 0/00	VSENV. # 8484
Turbidity 0 NTUs  Turbidity 100 NTUs  Temp 'C  Salinity 0/00	
Turbidity 0 NTUs  Turbidity 100 NTUs  Temp 'C  Salinity 0/00	115 Fav # 8441 / 1500
Turbidity 0 NTUs  Turbidity 100 NTUs  Temp 'C  Salinity 0/00	FINA ON TOO
Turbidity 0 NTUs  Turbidity 100 NTUs  Temp *C  Salinity 0/00	A William D
Turbidity 100 NTUs Temp 'C Salinity 0/00	
Temp °C Salinity 0/00  DATE: 37 15	
Salinity 0/00  DATE: 5) 15	
DATE: 0) 16	
DATE: 2/15 Cond. mS/cm 941 922 4,02	
DATE: 2/15  Cond. mS/cm  202  4,02	
Cond. mS/cm	
	rel
pH=4.0	
	INVE
10 911 /100 300 1183/1190	Work
D.O. mg/l	WOVE
REDOX mV  Turbidity 0 NTUs	MOVE

TtNUS Form 0024

Turbidity 100 NTUs

Temp °C Salinity 0/00

Blue

TETRA	TECH NUS, INC.		YSI 6820 MULTIPARAMETER METER								
Site Name: On-	Shore Derecktor Shipyard Fe ated in accordance with Manuf		Model No.: _	.: 112G02125	Decal No.:						
DATE: 2116	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks					
Cond. mS/cm		956	953	· · · · · · · · · · · · · · · · · · ·	ChO .	*					
pH=4.0		4.02	4.07	col :	1						
pH=7.0		7:01	7.13	214							
pH=10.0		10.09	10.03	P							
D.O. mg/l		12.27/108.9%	10.20 102	2.1000							
REDOX mV			·		4						
Turbidity 0 NTUs											
Turbidity 100 NTUs											
Temp *C											
Salinity 0/00				, in the second							
DATE: 3 17						lif.					
Cond. mS/cm		967	908								
pH=4.0		3.90	4,04	39							
pH=7.0		7.04	7.03	2114	(47)						
pH=10.0		10.05	10.03	71'							
D.O. mg/l		104.3%/ 11.77mg/L	9.87m/1/90	×070							
REDOX mV											
Turbidity 0 NTUs			31								
Turbidity 100 NTUs Temp *C		$\longrightarrow$									
Salinity 0/00											

TtNUS Form 0024

Blue

	TECH NUS, INC.		YSI 6820 MULTIPARAMETER METER								
ll .	2 1015 1004(0(0 015)) Shore Derecktor Shipvard Feb		:	Decal No.:							
	ated in accordance with Manuf	acturers instructions									
DATE: 2/18	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks					
Cond. mS/cm		973	959								
pH=7.0		7.11	7.13		1XX						
pH=10.0		10.03	10.0,7	Shirt K	AJ A						
D.O. mg/l REDOX mV		10.54 / 100.5 %	10.52 100.Z	3 114		/					
Turbidity 0 NTUs		, , , , , , , , , , , , , , , , , , ,		F1							
Turbidity 100 NTUs											
Temp *C											
Salinity 0/00											
DATE: A / 2 2.		0-0	0.10	45.000							
pH=4.0		987	942	LOT = 7980							
pH=7.0		3,87	4,04	Lot : 7979							
pH=10.0		10.03	10.01	Tot: 7988 (							
D.O. mg/l			10.01	L0707176	10						
REDOX mV		10:15 mg/L / 75:070	11.18 st 100.5%								
Turbidity 0 NTUs											
Turbidity 100 NTUs				2 = 20(6)							
Temp °C		- im-									
Salinity 0/00											

TtNUS Form 0024

TE TETRA	TECH NUS, INC.		YSI 6820 MULTIPARAMETER METER						
1	Shore Derecktor Shipyard Ferrated in accordance with Manu	hruary 2011  facturer's Instructions	Model No.	.: 112G02125	Decal No.:				
DATE: 2/24	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks			
Cond. mS/cm		972	933		0/				
pH=4.0		3.93	4,14			52.40			
pH=7.0		6.94	7.17	zel	1 WX	Y			
pH=10.0		10.02	11.01	1122	I ACO A				
D.O. mg/l		9.30 mg/L 9270	1170/95%	2 v	797				
REDOX mV		124.1 @ 10°C	143.1 Ca	11.70					
Turbidity 0 NTUs									
Turbidity 100 NTUs									
Temp °C									
Salinity 0/00						2000 September 1			
	Yar		A. V			2 341 VIII VIII VIII VIII VIII VIII VIII VI			
DATE: 2 26									
Cond. mS/cm		948	947						
pH=4.0		3,94	3.97		1.1				
pH=7.0		6.95	6.93			Н			
pH=10.0		9,98	10,05						
D.O. mg/l		145,5012,7°C	9.63mg/	L/92.5 Y					
REDOX mV		145.5012.7°C	APP IN IS		7				
Turbidity 0 NTUs		, , ,	AND S	× =					
Turbidity 100 NTUs									
Temp C	1	1							

TtNUS Form 0024

Salinity 0/00

MIH Equipment

TETRA	A TECH NUS, INC.	YSI 6820 MULTIPARAMETER METER						
	03F0420 recktor Shipyard		Model No.:	:Pofessional+	Decal No.:			
Instrument is calibr	rated in accordance with Manu	facturer's Instructions						
DATE:	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks		
Cond. mS/cm		0.924	0.906					
pH=4.0		4.07	4.02	- \				
pH=7.0		7.13	7.09	see yst Blue yst for soul				
pH=10.0		10.11	10.07	BUE				
D.O. mg/l		10.32mg/L/10090		CSOM	100			
REDOX mV		243.2	244	to to				
Turbidity 0 NTUs				000				
Turbidity 100 NTUs								
Temp °C								
Salinity 0/00								
DATE:								
Cond. mS/cm								
pH=4.0								
pH=7.0								
pH=10.0								
D.O. mg/l								
REDOX mV								
Turbidity 0 NTUs								
Turbidity 100 NTUs								
Temp <sup>®</sup> C								
Salinity 0/00								
TtNUS Form 0024								

Blue

TE TE	TRA TECH NUS, INC.
Serial No.:	OPFO

# YSI 6820 MULTIPARAMETER METER

Serial No.:	OF OF OF O	Model No.: The Wolessonal + Decal No.:
Site Name:	Derecktor Shipyard	Job No.: 112G02125

Instrument is calibrated in accordance with Manufacturer's Instructions

DATE: 3	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks
Cond. mS/cm		0.944	0.941	#7980		
pH=4.0		4.00	4 3.99	#7979	1MA	
pH=7.0		6.95	6, 96	# 7988	William	
pH=10.0		10.02	9,99	# 7972	190	
D.O. mg/l		11.23mg/L/105.090	10.87/94.7	<b>b</b> —		
REDOX mV	28 C 11 V	39.3	190	10=100001 7	sell solution	
Turbidity 0 NTUs			91.4			
Turbidity 100 NTUs	25 (3.8 )					
Temp °C						
Salinity 0/00						-2

DATE: 3/2					
Cond. mS/cm	9,23	914	00010	758,3 mm/g	
pH=4.0	3,99	4.03	3 MAN		
pH=7.0	6.94	7.0	aN		
pH=10.0	9,9	10.0	- U		1980
D.O. mg/l	9.73 mg/L 193.7°		L-94.090		
REDOX mV	260.0	164.8			10,000
Turbidity 0 NTUs					15) PFT
Turbidity 100 NTUs					
Temp °C		15.4			-
Salinity 0/00					100//410

TtNUS Form 0024



TE TETRA	TECH NUS, INC.		YSI 6820 MULTIPARAMETER METER							
	ecktor Shipyard ated in accordance with Manu	Decal No.:								
DATE: 3/3	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks				
Cond. mS/cm		0.921	0.933	# 7980		Toniano				
pH=4.0		4.00	402	# 7979	11/20					
pH=7.0		6.96	6.94	# 7988	MA	<i>-</i>				
pH=10.0	A in a	10.05	10.04	# 7972	4 (9)					
D.O. mg/l REDOX mV	DC S		10,06							
Turbidity 0 NTUs	283	247.1	231.9	10=100001 70be	el Soln					
Turbidity 100 NTUs										
Temp °C		100	1 910							
Salinity 0/00		10	- 0							
	03504	29 No	tblue -	> butstill use	ed by And					
DATE: 3/7										
Cond. mS/dm		0.981	0.924	00,0						
pH=4.0	4.31	4.00	4:14	Shape	10 1					
pH=7.0	6.72	7.06	7,09	(N)	1400					
pH=10.0		10016	10:13	V	49					
D.O. mg/l		10.92 m/L 101.02	13.72/1049	)						

TtNUS Form 0024

REDOX mV
Turbidity 0 NTUs
Turbidity 100 NTUs

Temp °C Salinity 0/00

TETRA	TECH NUS, INC.		YSI 6820 MULTIPARAMETER METER								
	ecktor Shipyard rated in accordance with Manu	ouzo	Model No.: _	: Professional + 112G02125	Decal No.:						
DATE: 3/8	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks					
Cond. mS/cm		0.931	0.969	(0.1110)	Oigridial	Remarks					
pH=4.0		4.08	4.46								
pH=7.0		7.15	7.06	a 1C							
pH=10.0		10.00	10,20	selvious							
D.O. mg/l			11.39/1022	Plant	44/	<del></del>					
REDOX mV		3/0/103/200	1111.000	000		<del></del>					
Turbidity 0 NTUs											
Turbidity 100 NTUs											
Temp °C			10.4								
Salinity 0/00											
DATE:					1						
Cond. m S/cm											
pH=4.0											
pH=7.0											
pH=10.0 D.O. mg/l											
REDOX mV											
Turbidity 0 NTUs			1 1								

TtNUS Form 0024

Turbidity 100 NTUs

Temp \*C Salinity 0/00



# **EQUIPMENT CALIBRATION LOG**

PRO.	JECT	NAME	On-Shore	Derecktor	Shinyard

INSTRUMENT NAME/MODEL:

Turbidimeter

2020E

SITE NAME:

NAVSTA Newport

MANUFACTURER:

Lamotte

PROJECT No .:

112G02125

SERIAL NUMBER:

SN-ME 14989

Date	Instrument	Person	Instrumen	t Settings	Instrumen	t Readings	Calibration	Remarks
of Calibration	I.D. Number	Performing Calibration	Pre- calibration	Post- calibration	calibration	calibration	Standard (Lot No.)	and Comments
3/1/11 3/1/11	3	ACC			-0.09 0.47	10,70		AM GOS



# **EQUIPMENT CALIBRATION LOG**

PROJECT NAME :	On-Shore Derecktor Shipyard	INSTRUMENT NAME/N	MODEL:	Turbidimeter	
SITE NAME:	NAVSTA Newport	MANUFACTURER:	Lamotte		
PROJECT No.:	112G02125	SERIAL NUMBER:	14	431	

Date	Instrument	Person	Instrumen	t Settings		t Readings	Calibration	Remarks
of	I.D.	Performing	Pre-	Post-	calibration	Poet	Standard	and
Calibration	Number	Calibration	calibration	calibration	calibration	calibration	(Lot No.)	Comments
2.14-11		ADC	<b>Racio</b> de Sala de Caración de		0.03	4.98		
2-14-11		PS	<del></del>	***	0.56	10.24		AN Of OR
2-15-11		NOC			0,00	9,19		AM S. C
2-15-11		ANOC.			0.00	8.89		PM CLC
2-16-11		AOC AOC			-D. 10	994		AM A
2-16-11		PS			-1,24	9,24		PM C
2-17-11		ADC			-0.13	10.10		AM V
2-17-11		B			0.64	11.6		PM
2-18-11		75			0.0	10.11		AM R
2-18-11		<b>40</b> C			-0.90	11.0		DM all
3-31-11		73			0.00	10.89		AM: P. Al
3-31-11		15		ash.	0.39	11.8		PM D.S.
2-24-11		AOC			0.36	10.79		AM O
2-24-1		ADC			-0.49	10.28		PM S
2-26-11		Anc	-		0.35	10.63		AM A
2-26-11		ADC	-		0.22	10.97		PM CSOSTIL
3-1-11		AOC.	<del>- </del>		-0.33	10.84		AM /A
3-1-11		- WC			-0.53	10,59		PM /
2 2-11		400	1		0,35	10,96		HIV AND
3-3-11		- 103 100			70,55	10:04	!	Par Palor KIC
2-3-11	•	WE -			0.04	11.5		AM CONTRACTOR
3-7-11	•	ADC	<u> </u>		0.09	11.8		LAA ()
3-7-11		40C		***	-0.14	10,50		AM AM
2-8-11		2000			-0.08	11.7-		W
3-5-11		HOC	1		-0.89	10.93		
		W V				1.00		



Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DEVELOPMENT LOG-DSY-MW02A Sampler: Amy Carey
Well ID: DSY-MW02A Well Type: Monitoring Well

Well Information			
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	11.82
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	0.8
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	N/A	Sample Method	NA

Equipment		
Water Quality Meter: N/A	Pump Control Box: N/A	Turbidity Meter: N/A

Purge I	nforma	tion											
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/16/11	11:35	12.51	2800.0	Highly Turbid	None	7.67	1.006	0.96	1640	10.8	NA	NA	NA
02/16/11	11:50	12.55	3000.0	Cloudy	None	8.09	1.051	1.13	221	11.2	NA	NA	NA
02/16/11	12:06	12.19	2000.0	Cloudy	None	8.17	0.981	1.12	64.5	11.1	NA	NA	NA
02/16/11	12:20	11.99	1200.0	Cloudy	None	8.21	0.959	1.48	1993	9.8	NA	NA	NA
02/16/11	12:35	12.02	1200.0	Cloudy	None	8.28	0.926	1.28	109.9	9.6	NA	NA	NA
02/16/11	12:51	12.02	1200.0	Highly Turbid	None	8.28	0.971	1.31	10000	9.2	NA	NA	NA
02/16/11	13:06	12.02	1000.0	Highly Turbid	None	8.30	0.997	1.34	10000	9.6	NA	NA	NA
02/16/11	13:24	12.22	1000.0	Highly Turbid	None	8.34	1.029	0.52	10000	9.8	NA	NA	NA
02/16/11	14:04	12.39	2600.0	Highly Turbid	None	8.01	1.175	0.79	10000	11.1	NA	NA	NA
02/16/11	14:20	12.50	2400.0	Cloudy	None	7.92	1.177	1.06	1294	10.7	NA	NA	NA
02/16/11	14:34	12.47	2800.0	Cloudy	None	7.89	1.182	0.90	180	11.4	NA	NA	NA
02/16/11	14:49	12.49	3200.0	Cloudy	None	7.90	1.131	0.92	185	11.7	NA	NA	NA
02/16/11	15:05	12.40	3200.0	Highly Turbid	None	7.91	1.148	0.82	185	11.2	NA	NA	NA
02/16/11	15:20	12.05	1210.0	Cloudy	None	7.97	1.074	1.09	85.1	9.41	NA	NA	NA

Final Pu	urge / S	Sample D	Data										
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (ºC)	ORP (mV)	Salinity (%)	Other
11:35	15:20	225	462.95	Cloudy	None	7.97	1.074	1.09	85.1	9.41	NA	NA	NA

Labo	ratory An	alysis	<b>;</b>							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

General Notes	
Amy Carey was the developer	

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DEVELOPMENT LOG-DSY-MW03 Sampler: Amy Carey
Well ID: DSY-MW03 Well Type: Monitoring Well

QC Duplicate ID: N/A MS/MSD: N/A

Well Information			
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	5.69 TPVC; 6.92 TOC
Top of Screen (ft-BTOR)	5.79	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	15.79	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	17.00	Sample Method	N/A

Equipment					
Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A

Purge I	nforma	tion											
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/14/11	11:49	11.00	2600.0	Cloudy	None	7.18	0.288	7.20	176	8.8	NA	NA	NA
02/14/11	12:06	12.83	2100.0	Highly Turbid	None	5.74	0.383	5.06	2500	11.2	NA	NA	NA
02/14/11	12:21	12.44	1800.0	Highly Turbid	None	5.69	0.399	5.00	2208	11.2	NA	NA	NA
02/14/11	12:37	13.25	2200.0	Highly Turbid	None	5.67	0.400	4.42	308	11.3	NA	NA	NA
02/14/11	12:53	13.78	2200.0	Highly Turbid	None	5.64	0.400	4.45	1587	11.1	NA	NA	NA
02/14/11	13:23	9.25	850.0	Highly Turbid	None	5.71	0.746	4.80	4070	10.7	NA	NA	NA
02/14/11	13:48	9.59	1000.0	Highly Turbid	None	5.63	0.379	4.71	7242	11.1	NA	NA	NA
02/14/11	14:06	9.32	1150.0	Highly Turbid	None	5.67	0.376	4.89	7612	10.4	NA	NA	NA
02/14/11	14:21	8.53	1300.0	Highly Turbid	None	5.66	0.388	4.94	10000	11.1	NA	NA	NA
02/14/11	14:40	8.92	1000.0	Highly Turbid	None	5.73	0.380	4.88	10000	11.3	NA	NA	NA
02/14/11	15:00	8.32	1200.0	Highly Turbid	None	5.64	0.384	4.84	10000	10.9	NA	NA	NA
02/14/11	15:14	8.20	800.0	Highly Turbid	None	5.71	0.382	4.96	10000	11.0	NA	NA	NA
02/14/11	15:28	9.61	1600.0	Slightly Turbid	None	5.76	0.389	5.00	1261	10.9	NA	NA	NA
02/14/11	15:42	11.62	3200.0	Slightly Turbid	None	5.81	0.402	4.55	246	10.6	NA	NA	NA

Final Pu	urge / S	Sample D	Data										
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11:49	15:42	233	345.2	Slightly Turbid	None	5.81	0.402	4.55	246	10.6	NA	NA	NA

Labo	Laboratory Analysis												
Coll. Date Time Description Analysis Preservative No. Type Vol. CO							COC Notes	Chain No.					

#### **General Notes**

Initial sounding of monitoring well MW-03 indicated a hard bottom @ 17.83' below top of casing. PVC to far down inb well to measure accuratly.

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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DEVELOPMENT LOG-DSY-MW08 Sampler: Amy Carey
Well ID: DSY-MW08 Well Type: Monitoring Well

Well Information											
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	7.06								
Top of Screen (ft-BTOR)	6.05	H&S PID Monitor Reading (ppm)	0.0								
Bottom of Screen (ft-BTOR)	11.05	Purge Method	Surge block and inertial pump								
Total Depth of Well (ft-BTOR)	11.50	Sample Method	NA								

Equipment		
Water Quality Meter: 03F032Q	Pump Control Box: N/A	Turbidity Meter: 14431

Purge I	nforma	tion											
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/15/11	9:25	9.15	500.0	Slightly Turbid	None	6.52	1.044	4.58	95	6.2	NA	NA	NA
02/15/11	9:40	9.49	600.0	Cloudy	None	6.23	1.073	2.91	811	6.8	NA	NA	NA
02/15/11	9:55	9.49	600.0	Cloudy	None	6.24	1.078	2.23	721	6.6	NA	NA	NA
02/15/11	10:11	9.75	1000.0	Highly Turbid	None	6.26	1.077	2.01	7756	7.6	NA	NA	NA
02/15/11	10:27	8.81	1000.0	Highly Turbid	None	6.19	1.068	2.06	10000	7.9	NA	NA	NA
02/15/11	10:41	8.40	950.0	Highly Turbid	None	6.22	1.063	2.03	10000	7.7	NA	NA	NA
02/15/11	10:58	8.25	1000.0	Highly Turbid	None	6.22	1.055	1.68	10000	7.6	NA	NA	NA
02/15/11	11:11	9.76	1400.0	Highly Turbid	None	6.23	1.051	2.00	10000	8.2	NA	NA	NA
02/15/11	11:25	8.71	2000.0	Highly Turbid	None	6.22	1.046	1.58	1806	8.5	NA	NA	NA
02/15/11	11:40	8.45	2200.0	Highly Turbid	None	6.19	1.046	1.48	1229	8.3	NA	NA	NA
02/15/11	11:55	8.22	1200.0	Highly Turbid	None	6.19	1.026	1.66	10000	8.7	NA	NA	NA
02/15/11	12:10	8.01	800.0	Highly Turbid	None	6.24	1.031	1.93	10000	7.7	NA	NA	NA
02/15/11	12:29	7.77	600.0	Highly Turbid	None	6.29	1.033	2.16	10000	6.8	NA	NA	NA
02/15/11	12:39	7.71	400.0	Highly Turbid	None	6.41	1.031	1.90	10000	7.7	NA	NA	NA
02/15/11	12:54	8.65	1000.0	Highly Turbid	None	6.49	1.030	2.21	10000	6.9	NA	NA	NA
02/15/11	13:10	7.28	1600.0	Slightly Turbid	None	6.28	1.044	1.35	202	7.1	NA	NA	NA

Final P	Final Purge / Sample Data												
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:25	13:10	225	245.5	Slightly Turbid	None	6.28	1.044	1.35	202	7.1	NA	NA	NA

Labo	Laboratory Analysis												
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.			

General Notes	
None	

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DEVELOPMENT LOG-DSY-MW12 Sampler: Amy Carey
Well ID: DSY-MW12 Well Type: Monitoring Well

QC Duplicate ID: N/A MS/MSD: N/A

Well Information	Well Information											
Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	7.95 TPVC									
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	20.2									
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump									
Total Depth of Well (ft-BTOR)	N/A	Sample Method	N/A									

Equipment		
Water Quality Meter: 03F032Q	Pump Control Box: N/A	Turbidity Meter: 14431

Purge I	nforma	tion											
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/17/11	9:29	9.18	1400.0	Highly Turbid	None	6.57	0.609	3.27	10000	12.9	NA	NA	NA
02/17/11	9:45	9.54	1600.0	Highly Turbid	None	7.37	0.626	1.60	79.9	12.9	NA	NA	NA
02/17/11	10:15	9.45	2000.0	Cloudy	None	7.74	0.667	0.91	233	12.6	NA	NA	NA
02/17/11	10:28	9.41	2000.0	Highly Turbid	None	7.64	0.623	0.89	10000	13.3	NA	NA	NA
02/17/11	10:46	9.30	2400.0	Highly Turbid	None	7.74	0.650	1.13	1462	12.6	NA	NA	NA
02/17/11	10:58	9.28	2300.0	Highly Turbid	None	7.45	0.619	0.92	1030	13.0	NA	NA	NA
02/17/11	11:21	9.27	2600.0	Cloudy	None	7.52	0.623	1.17	184	13.2	NA	NA	NA
02/17/11	11:34	8.72	800.0	Highly Turbid	None	7.35	0.606	1.75	10000	13.1	NA	NA	NA
02/17/11	11:50	8.01	1600.0	Highly Turbid	None	7.66	0.619	2.05	10000	11.9	NA	NA	NA
02/17/11	12:05	989	2200.0	Highly Turbid	None	7.39	0.602	2.17	10000	12.7	NA	NA	NA
02/17/11	12:20	9.86	1400.0	Highly Turbid	None	7.69	0.635	2.00	10000	12.5	NA	NA	NA
02/17/11	12:34	7.88	900.0	Highly Turbid	None	7.35	0.598	2.35	10000	12.0	NA	NA	NA
02/17/11	12:50	8.88	1200.0	Cloudy	None	7.67	0.623	1.99	826	12.3	NA	NA	NA
02/17/11	13:14	8.86	1200.0	Cloudy	None	7.25	0.612	1.67	220	12.3	NA	NA	NA

Final Pu	Final Purge / Sample Data													
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (ºC)	ORP (mV)	Salinity (%)	Other	
9:29	13:14	225	392.8	Cloudy	None	7.25	0.612	1.67	220	12.3	NA	NA	NA	

Labo	Laboratory Analysis												
Coll. Date Time Description Analysis Preservative No. Type Vol. CO							COC Notes	Chain No.					

#### **General Notes**

hard bottom of well when first opened. Developer is Amy Carey.

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DEVELOPMENT LOG-DSY-MW204 Sampler: Amy Carey
Well ID: DSY-MW204 Well Type: Monitoring Well

Well Information										
Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	10.23							
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	0.2							
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump							
Total Depth of Well (ft-BTOR)	N/A	Sample Method	N/A							

Equipment					
Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A

Purge I	Purge Information												
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/07/11	13:53	10.71	3200.0	Highly Turbid	None	6.31	0.495	3.21	NA	9.7	NA	NA	NA
03/07/11	14:08	10.82	3200.0	Highly Turbid	None	6.05	0.463	3.84	NA	10.0	NA	NA	NA
03/07/11	14:23	10.65	3100.0	Highly Turbid	None	6.08	0.449	3.43	NA	10.0	NA	NA	NA
03/07/11	14:38	10.65	3100.0	Highly Turbid	None	6.10	0.463	4.15	NA	9.9	NA	NA	NA
03/07/11	14:53	10.65	3100.0	Highly Turbid	None	6.10	0.456	4.28	NA	9.9	NA	NA	NA
03/07/11	15:08	10.72	3000.0	Highly Turbid	None	6.15	0.457	4.58	NA	9.8	NA	NA	NA
03/07/11	15:23	10.67	2400.0	Highly Turbid	None	6.16	0.464	4.49	NA	9.7	NA	NA	NA
03/07/11	15:38	10.67	2000.0	Highly Turbid	None	6.07	0.475	4.36	1228	8.9	NA	NA	NA
03/07/11	15:53	10.68	2000.0	Highly Turbid	None	6.05	0.469	4.09	1129	9.3	NA	NA	NA
03/07/11	16:08	10.70	2000.0	Highly Turbid	None	6.07	0.476	4.50	NA	8.8	NA	NA	NA
03/07/11	16:23	10.70	2000.0	Highly Turbid	None	6.14	0.466	4.27	NA	9.3	NA	NA	NA
03/07/11	16:38	10.70	2000.0	Highly Turbid	None	6.18	0.464	5.29	NA	9.2	NA	NA	NA
03/07/11	16:53	10.70	2000.0	Highly Turbid	None	6.16	0.466	5.15	NA	9.5	NA	NA	NA
03/07/11	17:08	10.71	1600.0	Highly Turbid	None	6.10	0.467	5.51	NA	8.8	NA	NA	NA
03/07/11	17:23	10.71	1200.0	Highly Turbid	None	6.17	0.469	5.51	NA	8.1	NA	NA	NA
03/07/11	17:38	10.71	1200.0	Highly Turbid	None	6.19	0.465	5.58	NA	9.1	NA	NA	NA
03/07/11	17:53	10.71	1200.0	Highly Turbid	None	6.02	0.466	5.68	NA	9.1	NA	NA	NA

I	Final Purge / Sample Data													
	Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (ºC)	ORP (mV)	Salinity (%)	Other
Γ	13:53	17:53	240	526.5	Highly Turbid	None	6.02	0.466	5.68	NA	9.1	NA	NA	NA

Labo	ratory An	alysis	;							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.

General Notes	
Amy CArey	

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DEVELOPMENT LOG-DSY-MW218 Sampler: Amy Carey
Well ID: DSY-MW218 Well Type: Monitoring Well

Well Information										
Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	15.37							
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	8.0							
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump							
Total Depth of Well (ft-BTOR)	N/A	Sample Method	Development only - No sampling							

Equipment		
Water Quality Meter: N/A	Pump Control Box: N/A	Turbidity Meter: N/A

Purge II	nforma	tion											
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/15/11	14:30	15.42	3500.0	Highly Turbid	None	6.48	0.943	0.26	10000	9.8	NA	NA	NA
02/15/11	14:45	15.42	2800.0	Highly Turbid	None	6.68	1.286	1.23	10000	8.9	NA	NA	NA
02/15/11	15:01	15.43	2400.0	Highly Turbid	None	6.71	1.345	1.20	3324	9.9	NA	NA	NA
02/15/11	15:17	15.44	400.0	Highly Turbid	None	6.71	0.878	1.57	10000	7.8	NA	NA	NA
02/15/11	15:36	15.44	900.0	Highly Turbid	None	6.58	0.767	1.21	10000	7.8	NA	NA	NA
02/15/11	15:46	15.42	800.0	Highly Turbid	None	6.75	0.781	1.49	10000	8.0	NA	NA	NA
02/15/11	16:02	15.41	1200.0	Highly Turbid	None	6.42	0.789	1.19	10000	8.8	NA	NA	NA
02/15/11	16:15	15.41	1000.0	Highly Turbid	None	6.72	0.843	1.58	10000	8.4	NA	NA	NA
02/15/11	16:30	15.41	1200.0	Highly Turbid	None	6.74	0.732	1.41	10000	8.3	NA	NA	NA
02/15/11	16:47	15.41	800.0	Highly Turbid	None	6.59	0.738	1.33	10000	7.0	NA	NA	NA
02/15/11	17:00	15.41	3600.0	Highly Turbid	None	6.68	0.799	1.12	1667	8.6	NA	NA	NA
02/16/11	9:05	15.21	2400.0	Highly Turbid	None	6.69	1.249	1.90	2249	10.4	NA	NA	NA
02/16/11	9:20	15.42	2400.0	Cloudy	None	6.69	1.272	0.92	183	11.6	NA	NA	NA
02/16/11	9:35	15.42	2400.0	Slightly Turbid	None	6.66	1.355	0.95	89.1	11.7	NA	NA	NA
02/16/11	9:50	15.23	2400.0	Clear	None	6.68	1.228	0.93	90.2	12.2	NA	NA	NA
02/16/11	10:05	15.20	2400.0	Clear	None	6.69	1.099	0.94	12.3	12.0	NA	NA	NA

Final Pu	Final Purge / Sample Data												
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:05	17:00	475	1294.0	Clear	None	6.69	1.099	0.94	12.3	12.0	NA	NA	NA

Labo	ratory An	alysis								
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

General No	otes	
Amy Carey wa	as developer.	

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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DEVELOPMENT LOG-DSY-MW219 Sampler: Amy Carey
Well ID: DSY-MW219 Well Type: Monitoring Well

Well Information							
Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	14.17 TPVC				
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	2.2				
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump				
Total Depth of Well (ft-BTOR)	N/A	Sample Method	N/A				

Equipment		
Water Quality Meter: N/A	Pump Control Box: N/A	Turbidity Meter: N/A

Purge I	Purge Information												
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/07/11	9:15	14.51	3200.0	Highly Turbid	None	7.07	0.637	1.33	NA	9.4	NA	NA	NA
03/07/11	9:30	17.71	3200.0	Clear	None	6.79	0.660	2.63	NA	9.9	NA	NA	NA
03/07/11	9:45	16.10	600.0	Highly Turbid	None	6.84	0.684	1.18	NA	9.7	NA	NA	NA
03/07/11	10:00	15.79	2000.0	Highly Turbid	None	6.85	0.706	1.07	NA	9.5	NA	NA	NA
03/07/11	10:15	15.76	1600.0	Highly Turbid	None	6.84	0.664	0.12	NA	9.2	NA	NA	NA
03/07/11	10:30	15.71	1800.0	Highly Turbid	None	6.84	0.684	0.49	NA	9.1	NA	NA	NA
03/07/11	10:45	15.52	1600.0	Highly Turbid	None	6.85	0.671	1.29	NA	9.6	NA	NA	NA
03/07/11	11:00	15.88	1600.0	Highly Turbid	None	6.81	0.689	0.50	NA	9.2	NA	NA	NA
03/07/11	11:15	16.10	1400.0	Highly Turbid	None	6.81	0.695	0.37	NA	9.4	NA	NA	NA
03/07/11	11:30	16.10	2000.0	Highly Turbid	None	6.83	0.692	0.95	NA	9.7	NA	NA	NA
03/07/11	11:45	16.17	2000.0	Highly Turbid	None	6.85	0.695	1.62	NA	9.5	NA	NA	NA
03/07/11	12:00	16.45	2000.0	Highly Turbid	None	6.85	0.694	1.04	NA	9.4	NA	NA	NA
03/07/11	12:15	16.42	2000.0	Highly Turbid	None	6.86	0.690	1.45	NA	9.2	NA	NA	NA
03/07/11	12:30	16.51	2000.0	Cloudy	None	6.85	0.689	1.09	530	9.3	NA	NA	NA
03/07/11	12:45	16.55	1200.0	Cloudy	None	6.93	0.695	1.01	425	8.8	NA	NA	NA
03/07/11	13:00	15.87	1000.0	Cloudy	None	6.92	0.702	2.00	463	8.5	NA	NA	NA
03/07/11	13:15	15.33	1000.0	Cloudy	None	9.92	0.695	1.98	437	8.8	NA	NA	NA

	Final Purge / Sample Data													
	Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
Γ	9:15	13:15	240	405.0	Cloudy	None	9.92	0.695	1.98	437	8.8	NA	NA	NA

Labo	ratory An	alysis	<b>;</b>							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

General Notes	
Amy Carey	

Log Page 1 of 1



Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DEVELOPMENT LOG-DSY-MW220 Sampler: Robin Clark
Well ID: DSY-MW220 Well Type: Monitoring Well

Well Information								
Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	7.86					
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	0.0					
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump					
Total Depth of Well (ft-BTOR)	N/A	Sample Method	N/A					

Equipment		
Water Quality Meter: N/A	Pump Control Box: N/A	Turbidity Meter: N/A

Purge I	Purge Information												
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/17/11	9:11	7.86	1000.0	Clear	None	NA	NA	NA	NA	NA	NA	NA	N/A
02/17/11	9:53	8.32	1000.0	Highly Turbid	None	7.23	1693	1.89	9999	11.2	278.8	NA	N/A
02/17/11	10:11	8.32	1000.0	Highly Turbid	None	7.49	1775	2.25	9999	11.5	230.4	NA	N/A
02/17/11	10:31	8.32	1000.0	Highly Turbid	None	7.40	1750	2.24	9999	10.8	230.7	NA	N/A
02/17/11	10:44	8.32	1000.0	Highly Turbid	None	7.51	1839	1.18	9999	11.2	182.3	NA	N/A
02/17/11	11:01	8.48	1000.0	Highly Turbid	None	7.23	2179	0.76	2879	12.1	124.0	NA	N/A
02/17/11	11:17	8.45	1000.0	Highly Turbid	None	7.51	1923	0.31	9999	12.3	54.4	NA	N/A
02/17/11	11:36	8.45	1000.0	Highly Turbid	None	7.14	2069	1.30	9999	12.1	59.3	NA	N/A
02/17/11	11:47	8.45	1000.0	Highly Turbid	None	7.45	2090	1.10	9999	11.2	59.9	NA	N/A
02/17/11	12:08	8.48	1000.0	Highly Turbid	None	7.11	2019	1.21	9999	11.4	54.6	NA	N/A
02/17/11	12:18	8.48	1000.0	Highly Turbid	None	7.45	2049	0.88	9999	11.5	22.9	NA	N/A
02/17/11	12:37	8.50	1000.0	Cloudy	None	7.19	1992	1.30	817	11.3	13.2	NA	N/A
02/17/11	12:52	8.50	1000.0	Cloudy	None	7.49	2019	1.29	306	11.6	-41.9	NA	N/A
02/17/11	12:59	8.50	1000.0	Cloudy	None	7.07	1979	1.12	240	11.6	-32.4	NA	N/A
02/17/11	13:10	8.50	1000.0	Cloudy	None	NA	NA	NA	NA	NA	NA	NA	N/A

Final P	Final Purge / Sample Data												
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (ºC)	ORP (mV)	Salinity (%)	Other
9:11	13:10	239	239.0	Cloudy	None	NA	NA	NA	NA	NA	NA	NA	N/A

Labo	ratory An	alysis								
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

General Notes	
Amy Carey was the developer	

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Study Area Screening Evaluation - Site 19 Event:

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

112G02125.SA.DM (ED00000152) Project No:

**DEVELOPMENT LOG-DSY-MW221** Sample ID: Sampler: Amy Carey Well ID: DSY-MW221 Well Type: Monitoring Well

MS/MSD: N/A QC Duplicate ID: N/A

Well Information										
Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	7.16 tpvc							
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	2.3							
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump							
Total Depth of Well (ft-BTOR)	N/A	Sample Method	N/A							

Equipment		
Water Quality Meter: N/A	Pump Control Box: N/A	Turbidity Meter: N/A

Purge I	Purge Information												
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/18/11	9:42	7.64	1200.0	Highly Turbid	None	5.85	0.535	3.99	NA	11.5	NA	NA	NA
02/18/11	9:57	7.66	1600.0	Highly Turbid	None	5.97	0.593	2.13	NA	11.4	NA	NA	NA
02/18/11	10:12	7.70	1600.0	Highly Turbid	None	6.05	0.571	1.45	NA	11.2	NA	NA	NA
02/18/11	10:27	7.60	1600.0	Highly Turbid	None	6.11	0.563	2.42	NA	11.1	NA	NA	NA
02/18/11	10:42	7.61	1200.0	Highly Turbid	None	6.14	0.554	2.56	NA	11.3	NA	NA	NA
02/18/11	10:57	6.68	1200.0	Highly Turbid	None	6.17	0.543	2.70	NA	11.3	NA	NA	NA
02/18/11	11:13	7.68	1600.0	Highly Turbid	None	6.22	0.526	2.31	NA	11.7	NA	NA	NA
02/18/11	11:27	7.71	1700.0	Highly Turbid	None	6.21	0.521	1.77	NA	11.6	NA	NA	NA
02/18/11	11:42	7.71	1300.0	Highly Turbid	None	6.21	0.512	1.93	NA	11.5	NA	NA	NA
02/18/11	11:57	7.71	1400.0	Highly Turbid	None	6.22	0.508	2.49	NA	11.7	NA	NA	NA
02/18/11	12:13	7.62	2000.0	Highly Turbid	None	6.13	0.502	1.66	NA	11.8	NA	NA	NA
02/18/11	12:27	7.72	1800.0	Highly Turbid	None	6.19	0.495	2.43	NA	11.4	NA	NA	NA
02/18/11	12:42	7.65	800.0	Highly Turbid	None	6.18	0.490	2.85	NA	10.6	NA	NA	NA
02/18/11	12:57	7.68	1200.0	Highly Turbid	None	6.14	0.499	6.11	NA	10.7	NA	NA	NA
02/18/11	13:12	7.67	1000.0	Highly Turbid	None	6.11	0.502	1.94	1737	10.4	NA	NA	NA
02/18/11	13:29	7.69	1000.0	Highly Turbid	None	6.12	0.510	1.57	1894	11.1	NA	NA	NA
02/18/11	13:42	7.64	600.0	Highly Turbid	None	6.17	0.514	2.53	1456	12.0	NA	NA	NA

	Final Purge / Sample Data													
	Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (ºC)	ORP (mV)	Salinity (%)	Other
ſ	9:42	13:42	240	324.9	Highly Turbid	None	6.17	0.514	2.53	1456	12.0	NA	NA	NA

Labo	ratory An	alysis								
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

#### **General Notes**

Amy Carey is the developer.
Based on experience developing new wells 02A and 220, a surge block was not used here. Very silty, sandy water comes up with the foot-valve and a surge block creates so much it starts to fill in the well.
Well had some amount of silt on the bottom when first started purging (soft).

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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DEVELOPMENT LOG-DSY-MW222 Sampler: Amy Carey
Well ID: DSY-MW222 Well Type: Monitoring Well

Well Information									
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	5.53						
Top of Screen (ft-BTOR)	4	H&S PID Monitor Reading (ppm)	0.2						
Bottom of Screen (ft-BTOR)	14	Purge Method	Surge block and inertial pump						
Total Depth of Well (ft-BTOR)	14	Sample Method	waterra pump						

Equipment			
Water Quality Meter: 03F032Q	Pump Control Box: N/A	Turbidity Meter: 144	31

Purge I	nforma	tion											
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/22/11	7:47	5.94	1000.0	Highly Turbid	None	7.35	1.070	4.68	NA	4.6	NA	NA	NA
02/22/11	8:04	6.02	1200.0	Highly Turbid	None	7.46	1.101	8.40	NA	6.0	NA	NA	NA
02/22/11	8:17	6.00	1600.0	Highly Turbid	None	7.49	1.044	8.15	NA	4.9	NA	NA	NA
02/22/11	8:40	5.57	1500.0	Highly Turbid	None	7.44	1.050	8.19	NA	5.2	NA	NA	NA
02/22/11	8:57	5.56	1300.0	Highly Turbid	None	7.57	0.912	7.84	NA	4.7	NA	NA	NA
02/22/11	9:09	5.91	400.0	Highly Turbid	None	7.66	0.933	11.74	NA	1.1	NA	NA	NA
02/22/11	9:32	5.88	500.0	Highly Turbid	None	7.61	0.859	7.92	NA	4.1	NA	NA	NA
02/22/11	9:47	5.88	1400.0	Highly Turbid	None	7.57	0.971	8.82	NA	5.8	NA	NA	NA
02/22/11	10:03	5.88	1400.0	Highly Turbid	None	7.57	0.890	8.42	NA	6.2	NA	NA	NA
02/22/11	10:17	5.88	1200.0	Highly Turbid	None	7.56	0.871	8.40	NA	6.2	NA	NA	NA
02/22/11	10:32	5.81	1200.0	Highly Turbid	None	7.54	0.860	8.42	NA	5.9	NA	NA	NA
02/22/11	10:47	5.91	1200.0	Highly Turbid	None	7.54	0.867	8.32	NA	6.4	NA	NA	NA
02/22/11	11:02	5.81	1000.0	Highly Turbid	None	7.58	0.865	8.54	NA	6.0	NA	NA	NA
02/22/11	11:17	5.85	1200.0	Highly Turbid	None	7.58	0.845	8.36	NA	6.7	NA	NA	NA
02/22/11	11:32	5.87	1200.0	Highly Turbid	None	7.56	0.832	7.92	NA	6.5	NA	NA	NA
02/22/11	11:47	5.85	1600.0	Highly Turbid	None	7.54	0.821	7.54	NA	6.6	NA	NA	NA

Final Purge / Sample Data													
Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
7:47	11:47	240	285.3	Hiahly Turbid	None	7.54	0.821	7.54	NA	6.6	NA	NA	NA

Labo	ratory An	alysis								
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

General Notes	
None	

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Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DEVELOPMENT LOG-DSY-MW223 Sampler: Robin Clark
Well ID: DSY-MW223 Well Type: Monitoring Well

Well Information										
Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	11.66 PVC							
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	0.3							
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump							
Total Depth of Well (ft-BTOR)	N/A	Sample Method	INERTIAL PUMP							

Equipment					
Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A

Purge I	Purge Information													
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other	
03/08/11	8:55	12.30	3200.0	Highly Turbid	None	11.96	0.871	2.33	NA	12.9	NA	NA	NA	
03/08/11	9:10	13.45	3200.0	Highly Turbid	None	9.78	0.358	0.78	NA	13.7	NA	NA	NA	
03/08/11	9:25	13.60	3200.0	Cloudy	None	8.62	0.342	0.84	376	13.8	NA	NA	NA	
03/08/11	9:40	12.76	3200.0	Cloudy	None	7.31	0.329	1.27	168	13.6	NA	NA	NA	
03/08/11	9:55	12.74	3200.0	Slightly Turbid	None	7.01	0.323	0.83	127	14.0	NA	NA	N/A	
03/08/11	10:10	12.75	3200.0	Slightly Turbid	None	6.92	0.321	1.44	85	14.0	NA	NA	NA	
03/08/11	10:25	12.77	2000.0	Slightly Turbid	None	6.88	0.323	1.29	19.2	14.0	NA	NA	NA	
03/08/11	10:40	12.72	2800.0	Slightly Turbid	None	6.91	0.323	0.84	32.9	14.1	NA	NA	NA	
03/08/11	10:55	12.59	1000.0	Highly Turbid	None	8.13	0.358	0.82	11544	13.3	NA	NA	NA	
03/08/11	11:10	12.59	2000.0	Clear	None	7.83	0.349	0.85	1857	13.4	NA	NA	NA	
03/08/11	11:25	12.55	1300.0	Slightly Turbid	None	7.32	0.331	1.04	136	13.9	NA	NA	NA	
03/08/11	11:40	12.54	1400.0	Slightly Turbid	None	7.04	0.327	1.01	40.9	14	NA	NA	N/A	
03/08/11	11:55	12.52	1200.0	Slightly Turbid	None	6.98	0.326	1.42	29.2	13.8	NA	NA	N/A	
03/08/11	12:10	12.50	1200.0	Slightly Turbid	None	7.00	0.328	1.38	71	13.5	NA	NA	N/A	
03/08/11	12:25	12.62	2200.0	Slightly Turbid	None	6.88	0.316	0.92	186	14.1	na	na	NA	
03/08/11	12:40	12.69	2400.0	Cloudy	None	6.78	0.312	0.71	51.5	14.0	NA	NA	NA	
03/08/11	12:55	12.78	3200.0	Slightly Turbid	None	6.73	0.311	1.24	87.6	14.3	NA	NA	NA	

Fi	Final Purge / Sample Data													
	Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (ºC)	ORP (mV)	Salinity (%)	Other
	8:55	12:55	240	550.5	Slightly Turbid	None	6.73	0.311	1.24	87.6	14.3	NA	NA	NA

Labo	ratory An	alysis	;							
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.

General Notes	
Amy Carey	

TETRA TECH NUS, Inc.

Event: Study Area Screening Evaluation - Site 19

Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard Log Page 1 of 1

Project No: 112G02125.SA.DM (ED00000152)

Sample ID: DEVELOPMENT LOG-DSY-MW224 Sampler: N/A

Well ID: DSY-MW224 Well Type: Monitoring Well

Well Information												
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	N/A									
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	N/A									
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump									
Total Depth of Well (ft-BTOR)	N/A	Sample Method	N/A									

Equipment					
Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A

Purge Information													
Date	Time	Level (ft- BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other

I	Final Purge / Sample Data													
	Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
	N/A	N/A	N/A	N/A	Clear	None	6.81	326.1	0.29	50	12.1	-52.7	NA	N/A

Labo	Laboratory Analysis													
Coll.	Date	Time	Description	Analysis	Preservative	No.	Туре	Vol.	COC Notes	Chain No.				
×	N/A	N/A	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	N/A				

General Notes	
None	

# APPENDIX B SOIL BORING AND MONITORING WELL CONSTRUCTION LOGS



BORING LOG FOR:

PROJECT NO.:

LOGGED BY:

DRILLED BY (Company/Driller):

GRD. SURFACE ELEVATION:

NS Newport - Site 19 - On-Shore Derecktor Shipyard

112G02125.SA.DM

M. Alroy

Technical Drilling Services/Gary

NA

 BORING NO.:
 DSY-SB201

 START DATE:
 2/11/2011

 COMPLETION DATE:
 2/11/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)							
1	2 5 11	2.0 2.0	S-1	Sandy SILT with Gravel		dark brown	SILT and Fine SAND, little F/M rounded Gravel	ML				0.1							
2	10 7				loose -				dry										
3	5 4	1.5 2.0	S-2 (DSY- SB201-SO- 0204)	Poorly Graded GRAVEL with Silt			Weathered PHYLLITE,some Silt	GP-GM				0.6							
4	3	1.0/2.0	S-3							None		0.2							
6	3 3		S-3 S-4			very loose	grey												
7	3	1.7 2.0			S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	SILTY GRAVEL			SILT and Weathered PHYLLITE	GM dam	damp	
8	3 5 4	1.6 / 2.0			loose							0.5							
9	5 4	1.0/ 2.0	S-5		louse							0.3							

TYPE OF DRILLING RIG:	CME 75		
METHOD OF ADVANCING BORING:	Hollow-Stem Auger		
METHOD OF SOIL SAMPLING:	2" and 3" Split-Spoon (2" for S-1 and S-2 intervals and 3" for all others)		<b>T</b> E
METHOD OF ROCK CORING:	NA		
GROUNDWATER LEVELS:	NA		TETRA TECH
OTHER OBSERVATIONS:	Sample DSY-SB201-SO-0204 was collected and analyzed by Empirical Laboratories, LLC for PAHs and Metals		
		BORING NO.: DSY-SB201	Page 1 of 2

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard PROJECT NO.: 112G02125.SA.DM M. Alroy LOGGED BY: DRILLED BY (Company/Driller): Technical Drilling Services/Gary GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB201 START DATE: 2/11/2011 COMPLETION DATE: 2/11/2011 MON. WELL NO.: NA CHECKED BY:

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	5 4 5	1.7 2.0	S-6	SILTY GRAVEL		grey	SILT and Weathered PHYLLITE	GP-GC				0.0
12	4 6 6	1.8 / 2.0	S-7	SILTY SAND	loose	dark brown	Fine SAND, little Silt	SM				0.1
13	7 9		3,	Poorly Graded SAND with Silt and Gravel		brown	Silty Fine SAND,some M/C Sand,rounded Fine Gravel	SP-SM	40	Nana		0.1
15	8 17 22 18	2.0   2.0		Silty GRAVEL with Sand	medium	grov	Silty E/C SAND E/M subangular/subrounded Gravel Glacial Till from 14" to 19"	GM	- damp	None		0.4
16	14 15 17 18	2.0 / 2.0		SIILY GRAVEL WITH SAND	dense		Silty F/C SAND,F/M subangular/subrounded Gravel - Glacial Till from 14' to 18'  EOB - 18.0' bgs	GIVI				0.3

TYPE OF DRILLING RIG:	CME 75		
METHOD OF ADVANCING BORING:	Hollow-Stem Auger		
METHOD OF SOIL SAMPLING:	2" and 3" Split-Spoon (2" for S-1 and S-2 intervals and 3" for all others)		TE
METHOD OF ROCK CORING:	NA		
GROUNDWATER LEVELS:	NA		TETRA TECH
OTHER OBSERVATIONS:			
		BORING NO.: DSY-SB201	Page 2 of 2

BORING LOG FOR:
PROJECT NO.:
112G02125.SA.DM

LOGGED BY:
M. Alroy

DRILLED BY (Company/Driller):
GRD. SURFACE ELEVATION:
NA

NS Newport - Site 19 - On-Shore Derecktor Shipyard

M. Alroy

M. Alroy

Technical Drilling Services/Gary

NA

 BORING NO.:
 DSY-SB202

 START DATE:
 2/9/2011

 COMPLETION DATE:
 2/9/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
1	1 5 12 11	1.8 2.0	S-1	Sandy SILT with Gravel	loose	dark brown	SILT, little F/C Sand, Gravel - crushed cobble in spoon	ML	moist	None		0.4
3	6 5 6	1.8 2.0	S-2 (DSY- SB202-SO- 0204)			grey	SILT,some weathered Bedrock (Phyllite),little Sand		damp			0.3
5	3 3 5 5	2.0 2.0	S-3	Sandy SILT with Gravel	loose	brown	SILT, some weathered Bedrock, little F/C Sand	ML	damp	None		0.3
7	2 3 3 5	1.3/2.0	S-4		very loose		SILT,some weathered Bedrock (Phyllite),little F/C Sand					0.1
9	2 2 3	1.3 2.0	S-5	Sandy SILT with Gravel	very loose	brown	SILT,some weathered Bedrock (Phyllite),little F/C Sand	ML	damp	None		0.1
10	2											

		BORING NO.: DSY-SB202	Page 1 of 2
OTHER OBSERVATIONS:	Sample DSY-SB202-SO-0204 was collected and analyzed by Empirical Laboratories, LLC for PAHs and Metals		
GROUNDWATER LEVELS:	NA .		TETRA TECH
METHOD OF ROCK CORING:	NA		-9
METHOD OF SOIL SAMPLING:	3" Split-Spoon		TE
METHOD OF ADVANCING BORING:	Hollow-Stem Auger		
TYPE OF DRILLING RIG:	CME 75		

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard PROJECT NO.: 112G02125.SA.DM M. Alroy LOGGED BY: DRILLED BY (Company/Driller): Technical Drilling Services/Gary GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB202 START DATE: 2/9/2011 COMPLETION DATE: 2/9/2011 MON. WELL NO.: NA CHECKED BY:

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	2	/		Sandy SILT with Gravel	very loose	brown	Top 0.4' - SILT,some weathered Bedrock (Phyllite),little F/C Sand	ML		None		
11	2	1.4 2.0	S-6	Organic SILT	soft	dark brown	Bottom 1.0': Organic SILT,trace F/C Sand	OL	damp	Organic - slight		0.1
	5											
12	3	/		Organic SILT	soft	dark brown	Ton 0.31: Organic SILT.trace F/C Sand	OL		Odor - slight		
13	8 14 24	2.0 2.0	S-7		medium dense	brown	Bottom 1.7': SILT,some Gravel,little F/C Sand		damp			0.2
15	4 6 10 10	2.0   2.0	S-8	Sandy SILT with Gravel	loose	light brown	SILT, little F/C Sand, little Gravel	ML	dry	None		0.0
17	9 13 15 16	2.0 2.0	S-9		medium dense		SILT,some Gravel,little F/C Sand EOB - 18.0' bgs		wet			0.2

TYPE OF DRILLING RIG:	CME 75	_	
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	TE
METHOD OF ROCK CORING:	NA		
GROUNDWATER LEVELS:	NA	_	TETRA TECH
OTHER OBSERVATIONS:		_	
		_	
		BORING NO.: DSY-SB202	Page 2 of 2

BORING LOG FOR:

PROJECT NO.:

LOGGED BY:

DRILLED BY (Company/Driller):

GRD. SURFACE ELEVATION:

NS Newport - Site 19 - On-Shore Derecktor Shipyard

112G02125.SA.DM

M. Alroy

Technical Drilling Services/Gary

NA

10

 BORING NO.:
 DSY-SB204

 START DATE:
 2/11/2011

 COMPLETION DATE:
 2/11/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.		REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	6			SILTY F/C SAND		black	Asphalt Subgrade	SW-SM				
1	16 17 13	1.3 2.0	S-1 (DSY- SB204-SO- 0002)				fine SAND,trace Silt		dry			0.1
3	9 17 17 18	1.0 2.0	S-2	SAND			SAND, little rounded Gravel	SP				0.5
5	7 14 16 12	2.0 2.0	S-3	Well-Graded SAND with Gravel	medium dense	grey	F/C SAND and F/M subangular/subrounded GRAVEL,trace Silt	SW	damp	None		0.1
7	10 14 18 20	1.7 2.0	S-4	CAND				60	uamp			0.1
9	6 15 21 25	1.2 2.0	S-5 (DSY- SB204-SO- 0810)	SAND			fine SAND,little rounded Gravel	SP				0.4

TYPE OF DRILLING RIG:

METHOD OF ADVANCING BORING:

METHOD OF SOIL SAMPLING:

METHOD OF SOIL SAMPLING:

METHOD OF ROCK CORING:

METHOD OF ROCK CORING:

MA

GROUNDWATER LEVELS:

OTHER OBSERVATIONS:

Samples DSY-SB204-SO-0002 and DSY-SB204-SO-0810 were collected and analyzed by Empirical Laboratories, LLC

for VOCs, GRO/DRO, PAHs, and Metals

BORING NO.: DSY-SB204

Page 1 of 2

BORING LOG FOR:

PROJECT NO.:

LOGGED BY:

DRILLED BY (Company/Driller):

GRD. SURFACE ELEVATION:

NS Newport - Site 19 - On-Shore Derecktor Shipyard

112G02125.SA.DM

M. Alroy

Technical Drilling Services/Gary

NA

 BORING NO.:
 DSY-SB204

 START DATE:
 2/11/2011

 COMPLETION DATE:
 2/11/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
11	8 18 29 19	1.5 2.0	S-6	SAND			fine SAND, little coarse Sand, little rounded Gravel	SP				0.2
13	9 17 17 15	1.4 2.0	S-7	Well-Graded SAND	medium dense	2501	F/C SAND and F/C subangular to subrounded Gravel up to 2"	SW	wet	None		0.5
15	4 20 29 48	0.3 2.0	S-8	with Gravel		grey	F/C SAND and F/C subangular to subrounded Graver up to 2	300	wet	None		0.1
16	26 29 35 45	0.8 2.0	S-9	Sandy SILT with Gravel	dense		SILT, some F/C Sand and F/M Gravel, very dense material - Glacial Till, very tight, dense material	ML				0.0

TYPE OF DRILLING RIG: CME 75

METHOD OF ADVANCING BORING: Hollow-Stem Auger

METHOD OF SOIL SAMPLING: 3" Split-Spoon

METHOD OF ROCK CORING: NA

GROUNDWATER LEVELS: NA

OTHER OBSERVATIONS:

METHOD OF ROCK CORING: NA

METHOD OF ROCK CORIN

BORING LOG FOR:
PROJECT NO.:
112G02125.SA.DM

LOGGED BY:
Robin Clark

DRILLED BY (Company/Driller):
GRD. SURFACE ELEVATION:
NS Newport - Site 19 - On-Shore Derecktor Shipyard

112G02125.SA.DM

Robin Clark

Technical Drilling Services/Gary

NA

 BORING NO.:
 DSY-SB205

 START DATE:
 2/15/2011

 COMPLETION DATE:
 2/15/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	9											
1	13	2.0 2.0	S-1 (DSY- SB205-SO-	Silty SAND with Gravel			F-M SAND SOME SILT AND FINE TO MEDIUM SUBANGULAR TO SUBROUNDED GRAVEL,DRY	SP-SM				0.2
	15 16		0002)		medium	grey-			al c	N		
2	12	/			dense	brown			dry	None		
	12	1.8 2.0	S-2	Well-Graded SAND with Gravel			F-C SAND SOME FINE TO MEDIUM ROUNDED GRAVEL,TRACE SILT,DRY	SW				0.1
3	15 16											
4	7	//										
	7	1.8 / 2.0	S-3	SAND - poorly graded	loose	grey-	F-M SAND,TRACE TO LITTLE C SAND AND FINE ROUNDED GRAVEL	SP	damp	None		0.3
5	7	1.8/ 2.0	3-3			brown						0.3
6	9 7											
	7			Poorly Graded SAND	loose	grey-	F-M SAND,TRACE TO LITTLE C SAND AND FINE ROUNDED GRAVEL	SP	damp	None		
7	9	1.5 2.0	S-4	·		brown						0.2
	12											
8	11		S-5 (DSY-	Poorly Graded SAND	medium dense	grey-brown	F-M SAND,TRACE TO LITTLE C SAND AND FINE ROUNDED GRAVEL	SP	damp	None		
9	12	0.6 2.0	SB205-SO- 0809)									0.2
	7		0809)									
10												

TYPE OF DRILLING RIG: METHOD OF ADVANCING BORING: METHOD OF SOIL SAMPLING: METHOD OF ROCK CORING: GROUNDWATER LEVELS: OTHER OBSERVATIONS:	CME 75 Hollow-Stem Auger 3" Split-Spoon NA NA Samples DSY-SB205-SO-0002 and DSY-SB205-SO-0809 were collected and analyzed by Empirical Laboratories, LLC for VOCs, GRO/DRO, PAHs, and Metals		TE TECH
		BORING NO.: DSY-SB205	Page 1 of 2

BORING LOG FOR:	NS Newport - Site 19 - On-Shore Derecktor Shipyard
PROJECT NO.:	112G02125.SA.DM
LOGGED BY:	Robin Clark
DRILLED BY (Company/Driller):	Technical Drilling Services/Gary
GRD. SURFACE ELEVATION:	NA

BORING NO.: DSY-SB205 START DATE: 2/15/2011 COMPLETION DATE: 2/15/2011 MON. WELL NO.: NA CHECKED BY:

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	6 14	1.5 2.0	S-6	SILT with gravelly/sandy matrix	loose	grev	SILT,SOME FINE TO COARSE SAND AND FINE TO MEDIUM ROUNDED TO ANGULAR GRAVEL,HARD	ML	dry	None		0.2
	10											
13	18 30 39	1.5 2.0	S-7	SILT with gravelly/sandy matrix	dense	arav	SILT,SOME FINE TO COARSE SAND AND FINE TO MEDIUM ROUNDED TO ANGULAR GRAVEL,HARD - TIII	ML	dry	None		0.2
	41											
14	48 47 49 50/0	1.7 2.0	S-8	SILT with gravelly/sandy matrix	dense		SILT,SOME FINE TO COARSE SAND AND FINE TO MEDIUM ROUNDED TO ANGULAR GRAVEL,HARD - TIII	ML	dry	None		0.3
16		0.0 0.0	S-9	COBBLES	very dense	-NA-	NO RECOVERY	OTHER	-NA-	None		
16.4			· · · · · · · · · · · · · · · · · · ·				EOB - 16.4' bgs		•	•	•	

TYPE OF DRILLING RIG: CME 75 METHOD OF ADVANCING BORING: Hollow-Stem Auger METHOD OF SOIL SAMPLING: 3" Split-Spoon METHOD OF ROCK CORING: NA **TETRA TECH** GROUNDWATER LEVELS: NA OTHER OBSERVATIONS: Page 2 of 2 BORING NO.: DSY-SB205

BORING LOG FOR:
PROJECT NO.:
112G02125.SA.DM

LOGGED BY:
M. Alroy

DRILLED BY (Company/Driller):
GRD. SURFACE ELEVATION:
NA

NS Newport - Site 19 - On-Shore Derecktor Shipyard

M. Alroy

M. Alroy

Technical Drilling Services/Gary

NA

 BORING NO.:
 DSY-SB206

 START DATE:
 2/14/2011

 COMPLETION DATE:
 2/14/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	8	/		ASPHALT/PAVEMENT GRAVEL with minor fine sand and silt		black	Top 0.4' - ASPHALT Middle 0.17' - GRAVEL little F/C SAND little Silt	OTHER GP	dry			
1	9 11	1.8 2.0	S-1 (DSY- SB206-SO- 0002)	Well-Graded SAND with Silt	medium dense	grey	Bottom 1.3' - F/M SAND, little Silt, trace Gravel	SM	damp	None		0.0
2	13	/										
3	14 19 20	2.0 2.0	S-2	Well-Graded SAND								
4	10 14	2.0 / 2.0	2.0 S-3	with Silt			F/M SAND,little Silt,trace Gravel	SM				0.0
6	20				medium	grey			- damp	None		
7	15	2.0 / 2.0	S-4		dense							0.0
9	18 12 14 21 23	2.0/2.0	S-5 (DSY- SB206-SO- 0810)	Poorly Graded SAND with Gravel			C SAND,some Gravel,trace Silt	SP				0.1

		BORING NO.: DSY-SB206	Page 1 of 2
	for VOCs, GRO/DRO, PAHs, and Metals		
OTHER OBSERVATIONS:	Samples DSY-SB206-SO-0002 and DSY-SB206-SO-0810 were collected and analyzed by Empirical Laboratories, LLC		
GROUNDWATER LEVELS:	<u>NA</u>		TETRA TECH
METHOD OF ROCK CORING:	<u>NA</u>		
METHOD OF SOIL SAMPLING:	3" Split-Spoon		TE
METHOD OF ADVANCING BORING:	Hollow-Stem Auger		
TYPE OF DRILLING RIG:	CME 75		

BORING LOG FOR:	NS Newport - Site 19 - On-Shore Derecktor Shipyard
PROJECT NO.:	112G02125.SA.DM
LOGGED BY:	M. Alroy
DRILLED BY (Company/Driller):	Technical Drilling Services/Gary
GRD. SURFACE ELEVATION:	NA

 BORING NO.:
 DSY-SB206

 START DATE:
 2/14/2011

 COMPLETION DATE:
 2/14/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	16 11	2.0 / 2.0	S-6	Poorly Graded SAND			Top 1.0' - F/C SAND,some Gravel Little Silt		damp			0.0
11	12 15	2.07 2.0	3-0	with Gravel	medium	grey	Bottom 1.0' - F/C SAND,some Gravel,trace Silt - shell fragments in split spoon sample	SP	wet	None		0.0
13	16 15 16	2.0 2.0	S-7	Poorly Graded SAND with Silt and Gravel	dense	dark grey	F/C SAND,some Gravel,little Silt		saturated	None		0.1
14	15			Silty SAND with Gravel		grey	F/C SAND,some Silt,little Gravel EOB - 14.0' bgs	SM				

TYPE OF DRILLING RIG: CME 75

METHOD OF ADVANCING BORING: Hollow-Stem Auger

METHOD OF SOIL SAMPLING: 3" Split-Spoon

METHOD OF ROCK CORING: NA

METHOD OF ROCK CORING: NA

OTHER OBSERVATIONS: TETRA TECH

BORING NO.: DSY-SB206

Page 2 of 2

BORING LOG FOR:
PROJECT NO.:
112G02125.SA.DM

LOGGED BY:
M. Alroy

DRILLED BY (Company/Driller):
GRD. SURFACE ELEVATION:
NA

NS Newport - Site 19 - On-Shore Derecktor Shipyard

M. Alroy

M. Alroy

Technical Drilling Services/Gary

NA

 BORING NO.:
 DSY-SB207

 START DATE:
 2/15/2011

 COMPLETION DATE:
 2/15/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
1	8 16 17 15	1.8 2.0	S-1 (DSY- SB207-SO- 0002)	Silty SAND with Gravel	medium dense	grey	F-C SAND,some fine to medium rounded gravel,dry	SM	dry	None		0.1
3	11 10 11 12	2.0 / 2.0	S-2	Poorly Graded SAND	medium dense	grey-blue	VERY FINE TO FINE SAND,TRACE SILT	SP	damp	None		0.0
5	9 10 12	1.6 2.0	S-3	SAND - well graded	loose	grey	F-C SAND,trace fine to medium gravel	SW				0.0
7	11 16 20 20	2.0   2.0	S-4	CAND all and d	medium		F-C SAND, trace shell fragments and fine gravel	614		N		0.0
9	10 15 16 20	2.0 2.0 S-5	SAND - well graded	dense	grey	F-M SAND,trace crs sand and fine rounded gravel,damp	SW	damp	None		0.1	

TYPE OF DRILLING RIG:	CME 75		
METHOD OF ADVANCING BORING:	Hollow-Stem Auger		
METHOD OF SOIL SAMPLING:	3" Split-Spoon		TE
METHOD OF ROCK CORING:	NA		
GROUNDWATER LEVELS:	NA		TETRA TECH
OTHER OBSERVATIONS:	Sample DSY-SB207-SO-0002 was collected and analyzed by Empirical Laboratories, LLC		
	for VOCs, GRO/DRO, PAHs, and Metals	<u></u>	
		BORING NO.: DSY-SB207	Page 1 of 2

BORING LOG FOR:	NS Newport - Site 19 - On-Shore Derecktor Shipyard
PROJECT NO.:	112G02125.SA.DM
LOGGED BY:	M. Alroy
DRILLED BY (Company/Driller):	Technical Drilling Services/Gary
GRD. SURFACE ELEVATION:	NA

 BORING NO.:
 DSY-SB207

 START DATE:
 2/15/2011

 COMPLETION DATE:
 2/15/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	9		S-6 (DSY-									
11	18	2.0 2.0	•	Well-Graded SAND with Gravel		grev	0-1.8 ft F-CRS SAND,trace fine to medium rounded gravel.,1.8-2.0 ft medium rounded gravel and m-c sand,wet	SW				0.1
	19				medium dense				wet	None		
12	10				uerise							
	21	1.8 / 2.0	S-7	SANDY GRAVEL		grey- brown	F-C SAND AND SUBANGULAR TO ROUNDED FINE TO MEDIUM GRAVEL,WET. TRACE SILT	GW				0.1
13	31					DIOWII						
	31						EOB - 14.0' bgs					

TYPE OF DRILLING RIG: CME 75 METHOD OF ADVANCING BORING: Hollow-Stem Auger METHOD OF SOIL SAMPLING: 3" Split-Spoon METHOD OF ROCK CORING: NA GROUNDWATER LEVELS: NA **TETRATECH** OTHER OBSERVATIONS: Sample DSY-SB207-SO-1012 was collected and analyzed by Empirical Laboratories, LLC for VOCs, GRO/DRO, PAHs, and Metals BORING NO.: DSY-SB207 Page 2 of 2

BORING LOG FOR:
PROJECT NO.:
112G02125.SA.DM

LOGGED BY:
M. Alroy

DRILLED BY (Company/Driller):
GRD. SURFACE ELEVATION:
NA

NS Newport - Site 19 - On-Shore Derecktor Shipyard

M. Alroy

M. Alroy

Technical Drilling Services/Gary

NA

10

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.		REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	14	/		Poorly Graded SAND with Silt and Gravel	medium	dark grey	Top 0.5' - F/C SAND, some Silt, little Gravel, trace Asphalt	SP	moist	None		
	16	1.0 / 2.0	S-1	SANDY SILT	dense	grey	Bottom 0.5' - SILT,some F/C Sand,little Gravel	ML	damp	None		1.4
1	11	1.0/ 2.0	2-1									1.4
	4											
2	4			SANDY SILT	loose	grey	SILT,some F/C Sand,little Gravel	ML	damp	None		
3	3	1.7 2.0	S-2									1.3
	10											
4	6	/										
	15	1.4 / 2.0	S-3	SANDY SILT	medium dense	grey	SILT,little F/C Sand,little Gravel	ML	dry	None		1.3
5	23	1.4/ 2.0	3-3									1.5
	11											
6	4			6.1.1.D.V.6.11.T	medium		217 W			N		
7	9	1.4 2.0	S-4	SANDY SILT	dense	grey	SILT,little F/C SAND,little Gravel	ML	dry	None		1.0
	16											
8	2	/										
	5	1.25 2.0	S-5	SANDY SILT	loose	grey	SILT,some F/C Sand,little Gravel	ML	dry	None		1.4
9	7	1.23/ 2.0	3-3									1.4
	6											

TYPE OF DRILLING RIG:	CME 75	_	
METHOD OF ADVANCING BORING:	Hollow-Stem Auger		
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	TE
METHOD OF ROCK CORING:	NA	_	
GROUNDWATER LEVELS:	NA		TETRA TECH
OTHER OBSERVATIONS:			
		-	
		BORING NO.: DSY-SB218	Page 1 of 2

20

 BORING NO.:
 DSY-SB218

 START DATE:
 2/8/2011

 COMPLETION DATE:
 2/8/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	2 4 6	1.6 2.0	S-6	SILT with gravelly/sandy matrix	loose	grey	SILT,little F/C Sand,little Gravel	ML	dry	None		0.8
	8											
13	10 13 21	1.4 2.0	S-7	SHALE	medium dense	grey	WEATHERED PHYLLITE LITTLE FINE SAND AND SUILT	GP	wet	None		0.6
	10											
14	5 5 5	1.6 2.0	S-8	SILTY GRAVEL	loose	grey	GRAVEL ,some Silt,little F/C Sand,trace weathered bedrock	GM	moist	None		0.6
	6											
16	5 4	1.6 2.0	S-9	Poorly Graded SAND with Silt and Gravel	loose	grey	F/C SAND,little Silt,little Gravel,trace weathered bedrock	SP	wet	None		0.6
	5											
18	4 2 4 8	1.4 2.0	S-10	Poorly Graded GRAVEL with Silt and Sand	loose	grey	GRAVEL,some Silt,little F/C Sand	GP	wet	None		0.5

TYPE OF DRILLING RIG:
METHOD OF ADVANCING BORING:
METHOD OF SOIL SAMPLING:
METHOD OF SOIL SAMPLING:
METHOD OF ROCK CORING:
METHOD OF ROCK CORING:
MA

GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

BORING NO.: DSY-SB218

Page 2 of 2

EOB - 20.0' bgs

BORING LOG FOR:
PROJECT NO.:
112G02125.SA.DM

LOGGED BY:
M. Alroy

DRILLED BY (Company/Driller):
GRD. SURFACE ELEVATION:
NA

NS Newport - Site 19 - On-Shore Derecktor Shipyard

M. Alroy

M. Alroy

Technical Drilling Services/Gary

NA

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
1	5 8 8	1.8 2.0	S-1	Sandy SILT with Gravel	loose	brown	SILT,some f-c Sand,little Gravel	ML	damp	None		0.0
2	20 15	1.0 / 2.0	S-2	Poorly Graded GRAVEL with Silt and Sand	dense	brown	GRAVEL, some Silt, little F/C Sand, trace Asphalt (asphalt in tip)	GP	damp	None		0.3
3	50/0		3-2					D.A.I.	al as s	Nana		0.5
5	9 9 8	0.2 2.0	S-3	SANDY SILT	loose	grey	SILT.some F/C Sand	ML	dry	None		0.7
6	6											
7	5	1.6 2.0	S-4	SANDY SILT	loose	grey	SILT,little F/C Sand,trace gravel	ML	dry	None		1.9
8	2	/		Convelle CUT with Const	Janea	grov.	CUT and CDAVEL little F/C and transcripted debrie	N.41	des	None		
9	9 10 10	1.5 2.0	S-5	Gravelly SILT with Sand	loose	grey	SILT, and GRAVEL, little F/C sand, trace wood debris	ML	dry	None		1.0
10	10	/										

TYPE OF DRILLING RIG:	CME 75	_	
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	<b>  T</b> E
METHOD OF ROCK CORING:	NA .	_	
GROUNDWATER LEVELS:	NA .		TETRA TECH
OTHER OBSERVATIONS:			
		-	
		BORING NO.: DSY-SB219	Page 1 of 2

NS Newport - Site 19 - On-Shore Derecktor Shipyard BORING LOG FOR: PROJECT NO.: 112G02125.SA.DM M. Alroy LOGGED BY: Technical Drilling Services/Gary DRILLED BY (Company/Driller): GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB219 2/8/2011 START DATE: 2/8/2011 COMPLETION DATE: MON. WELL NO.: NA CHECKED BY:

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
11	8 10 5 3	0.0 2.0	S-6									No recovery / no sample
13	2 2 3 2	0.0 2.0	S-7									No recovery / no sample
14	1	0.4 2.0	S-8	Silty GRAVEL	loose	grey	GRAVEL,SOME silt and F/C sand	GP	wet	None		0.1
15	1											-
16	1	0.2 2.0	S-9	SILTY SAND	loose	grey	SAND.some Silt trace gravel	SM	wet	None		0.0
18	3 1 2 2	1.2 2.0		Gravelly SILT with Sand	loose	grey	SILT,some gravel,little F/C sand	ML	wet	None		0.6
20	3						EOB - 20.0' bgs					

TYPE OF DRILLING RIG: CME 75 METHOD OF ADVANCING BORING: Hollow-Stem Auger METHOD OF SOIL SAMPLING: 3" Split-Spoon METHOD OF ROCK CORING: NA GROUNDWATER LEVELS: NA **TETRA TECH** OTHER OBSERVATIONS: BORING NO.: DSY-SB219 Page 2 of 2

BORING LOG FOR:
PROJECT NO.:
112G02125.SA.DM

LOGGED BY:
M. Alroy

DRILLED BY (Company/Driller):
GRD. SURFACE ELEVATION:
NA

NS Newport - Site 19 - On-Shore Derecktor Shipyard

M. Alroy

M. Alroy

Technical Drilling Services/Gary

NA

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
1	12 16 25 33	1.3 2.0	S-1	Gravelly SILT with Sand	medium	dark brown	SILT and subangular to subrounded GRAVEL,up to 1",some F/M Sand	ML	damp			0.1
3	18 15 15 13	1.2 2.0	S-2	Well-Graded SAND with Gravel	dense		Very fine to fine SAND,some sub-angular Gravel up to 1",trace of Silt - brick fragment	sw	dry			0.1
5	5 4 4 2	1.6 2.0	S-3		loose	grey			damp	None		0.0
7	3 3 2	1.7 2.0	S-4	Poorly Graded SAND	very loose		Fine SAND,trace Silt	SP				0.1
9	1 1 1 1	1.7 2.0	S-5		,				wet			0.3

TYPE OF DRILLING RIG:	CME 75		
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	TE
METHOD OF ROCK CORING:	<u>N</u> A	_	
GROUNDWATER LEVELS:	NA		TETRA TECH
OTHER OBSERVATIONS:			
		-	
		BORING NO.: DSY-SB220	Page 1 of 2

BORING LOG FOR:
PROJECT NO.:
112G02125.SA.DM

LOGGED BY:
M. Alroy

DRILLED BY (Company/Driller):
GRD. SURFACE ELEVATION:
NA

NS Newport - Site 19 - On-Shore Derecktor Shipyard

M. Alroy

M. Alroy

Technical Drilling Services/Gary

NA

DEPTH (FEET)	BLOWS	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	1											
	2	1.0 / 2.0	S-6									0.4
11	2											
12	1	/		Poorly Graded SAND with Gravel	very loose		Fine SAND,some F/M Gravel rounded,trace of coarse Sand and Silt	SP				
12	1			with Gravei								
13	1	1.5 2.0	S-7									0.1
	1											
14	2	//				grey						
	6											
15	4	1.0 2.0	S-8		loose		F/M SAND and F/M rounded GRAVEL,some coarse Sand,trace Silt		wet	None		0.0
	2			Well-Graded SAND with Gravel				SW				
16	2			with Graver								
	2	1.2 / 2.0	S-9				Top 1.6' - F/M SAND and F/M rounded GRAVEL,some coarse Sand,trace Silt					0.0
17	2	1.2/ 2.0	3-9									0.0
	2	/		SILT	very loose		Bottom 0.4' - SILT	ML				
18	1				,		Top 0.6' - SILT					
10	1	0.8 2.0	S-10									0.3
19	1		3 10	Poorly Graded SAND black Bottom 1.4' - Fine SAND	SP							
20	1	/					EOB - 20.0' bgs					

TYPE OF DRILLING RIG:	CME 75		
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	Tt
METHOD OF ROCK CORING:	NA	_	
GROUNDWATER LEVELS:	NA	_	TETRA TECH
OTHER OBSERVATIONS:		_	
		_	
		BORING NO.: DSY-SB220	Page 2 of 2

10

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	8			ASPHALT/PAVEMENT		black	(Used augers to get through asphalt)	OTHER	dry			
1	7	1.7 2.0	S-1	Silty SAND with Gravel	loose	dark grey	F/C SAND, little Silt, little Gravel	SM	damp	None		0.8
	5	/										
3	4 3 3 2	1.8 2.0	S-2	Silty SAND with Gravel	very loose	dark grey	F/C SAND, little Silt, little Gravel	SM	damp	None		0.7
4	2	1.0 / 2.0	S-3	Poorly Graded SAND with Gravel		grey	VF-F SAND,some rounded fine gravel,some silt,damp	SP				0.2
5	3	1.0 / 2.0	3-3									0.2
6	3	1.0 / 2.0	S-4	Poorly Graded SAND	very loose	dark orange	rusty brown F-M SAND,trace silt,wet	SP	wet	None		0.0
7	3	1.5/ 2.0	3-4									0.0
8	2	1.2 2.0	S-5	Silty SAND with Gravel	very loose	grey	F-M SAND, some rounded fine gravel, and silt, wet	SM	wet	None		0.0
,	1											

TYPE OF DRILLING RIG:	CME 75		
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	Tt
METHOD OF ROCK CORING:	NA	_	
GROUNDWATER LEVELS:	NA	_	TETRA TECH
OTHER OBSERVATIONS:		_	
		_	
		BORING NO.: DSY-SB221	Page 1 of 2

BORING LOG FOR:	NS Newport - Site 19 - On-Shore Derecktor Shipyard
PROJECT NO.:	112G02125.SA.DM
LOGGED BY:	M. Alroy
DRILLED BY (Company/Driller):	Technical Drilling Services/Gary
GRD. SURFACE ELEVATION:	NA

 BORING NO.:
 DSY-SB221

 START DATE:
 2/14/2011

 COMPLETION DATE:
 2/14/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	1 1 4 5	1.8 2.0	S-6	Silty SAND with Gravel	very loose	grey	F-M SAND,some rounded fine gravel,and silt,wet	SP	wet	None		0.1
12	7 9 10	1.0 2.0		Silty SAND with Gravel	loose	grey	F-M SAND,some rounded fine gravel,and silt,wet	SP	wet	None		0.2
14	12 4 6	1.3/2.0		Silty SAND with Gravel	medium dense	grey	0-1.0 FT FINE SAND,trace silt,wet. 1.0-1.3 SILTY GRAVEL,sime fine sand,wet.	SM	wet	None		0.1
16	16 21						EOB - 16.0' bgs					

TYPE OF DRILLING RIG:
METHOD OF ADVANCING BORING:
METHOD OF SOIL SAMPLING:
METHOD OF SOIL SAMPLING:
METHOD OF ROCK CORING:
METHOD OF ROCK CORING:
MA

GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

BORING NO.: DSY-SB221

Page 2 of 2

10

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.		REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
1	6 9 24	1.5 2.0	S-1	Well-Graded SAND with Silt and Gravel	medium dense	grey	FINE TO MEDIUM SAND,SOME SILT AND FINE ROUNDED GRAVEL,DRY	SP-SM	dry	None		3.7
	17											
2	13 11	1.3 / 2.0	6.3	Well-Graded SAND with Gravel	loose	grev	FINE TO COARSE SAND SOME FINE TO MEDIUM SUBROUNDED TO SUBANGULAR GRAVEL,DRY	SP-SM	dry	None		0.6
3	8 7	1.3 / 2.0	S-2									0.6
5	8 10	1.5 / 2.0	S-3	Well-Graded SAND with Gravel	loose	σrον	FINE TO MEDIUM SAND,SOME FINE TO MEDIUM ROUNDED TO ANGULAR GRAVEL AND COARSE SAND,DAMP	SW	damp	None		0.3
3	9											
6	3			Poorly Graded SAND	loose	grev-hlue	FINE TO MEDIUM SAND, WET	SP	wet	None		
	4					87		-				
7	5	0.7 / 2.0	S-4									0.5
8	1	/										
	1	1.3 / 2.0	C.F.	Poorly Graded SAND	very loose	grey	FINE TO MEDIUM SAND, WET	SP	wet	None		0.7
9	1	1.3 2.0	S-5									0.7
	1											

TYPE OF DRILLING RIG:	CME 75	_	
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	TE
METHOD OF ROCK CORING:	NA .	_	
GROUNDWATER LEVELS:	NA .		TETRA TECH
OTHER OBSERVATIONS:			
		BORING NO.: DSY-SB222	Page 1 of 3

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)		SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	1	10/20	0.6	Poorly Graded SAND	very loose	grey	FINE TO MEDIUM SAND, WET	SP	wet	None		4.2
11	2	1.0 / 2.0	S-6									1.2
13	9 19 22 14	2.0 2.0	S-7	Poorly Graded SAND	medium dense	grey	0-1.5 FT SAME AS ABOVE,1.5-2.0 FT PLATY FINE TO MEDIUM GRAVEL,SOME SILT AND FINE TO MEDIUM SAND,WET	SP	wet	None		1.9
14	8	1.0 / 2.0	S-8	SILT with gravelly/sandy matrix			SILT,SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL,TILL	ML	damp			0.6
15	15 15	1.07 2.0	3-0									0.0
16	21 27	1.0 / 2.0	S-9	SILT with gravelly/sandy matrix	medium dense	grey	SILT,SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL,TILL	ML	damp	None		0.4
17	31 35	1.5/ 2.5	3-9									0.4
18	6			SILT with gravelly/sandy matrix	medium dense	grey	SILT, SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL, TILL	ML	damp	None		
19	13 16	0.7 / 2.0	S-10									1.1

TYPE OF DRILLING RIG:	CME 75		
METHOD OF ADVANCING BORING:	Hollow-Stem Auger		
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	THE
METHOD OF ROCK CORING:	NA .	_	
GROUNDWATER LEVELS:	NA		TETRA TECH
OTHER OBSERVATIONS:			
		BORING NO.: DSY-SB222	Page 2 of 3

BORING LOG FOR:	NS Newport - Site 19 - On-Shore Derecktor Shipyard
PROJECT NO.:	112G02125.SA.DM
LOGGED BY:	Robin Clark
DRILLED BY (Company/Driller):	Technical Drilling Services/Gary
GRD. SURFACE ELEVATION:	NA

BORING NO.: DSY-SB222

START DATE: 2/16/2011

COMPLETION DATE: 2/16/2011

MON. WELL NO.: NA

CHECKED BY:

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
20	5 6			SILT with gravelly/sandy matrix	loose	grey	SILT,SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL,TILL	ML	damp	None		
21	10	0.8 2.0	S-11									0.8
22	16											
22	20			SILT with gravelly/sandy matrix	dense	grey	SILT,SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL,TILL	ML	damp	None		
23	48	1.0 / 2.0	S-12									0.9
24	65	<del>/</del> ,										
	75 120/5	1.0 / 2.0	6.42	SILT with gravelly/sandy matrix	very dense	grey	SILT,SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL,TILL	ML	dry	None		1.0
25		1.0/ 2.0	S-13									1.0
26		/					EOB - 26.0' bgs					

TYPE OF DRILLING RIG:

METHOD OF ADVANCING BORING:

METHOD OF SOIL SAMPLING:

METHOD OF ROCK CORING:

METHOD OF ROCK CORING:

MA

GROUNDWATER LEVELS:

OTHER OBSERVATIONS:

CME 75

Hollow-Stem Auger

3" Split-Spoon

NA

TETRATECH

BORING NO.: DSY-SB222 Page 3 of 3

BORING LOG FOR:
PROJECT NO.:
112G02125.SA.DM

LOGGED BY:
M. Alroy

DRILLED BY (Company/Driller):
GRD. SURFACE ELEVATION:
NA

NS Newport - Site 19 - On-Shore Derecktor Shipyard

M. Alroy

M. Alroy

Technical Drilling Services/Gary

NA

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
1	9 6 5 4	1.0 2.0	S-1	GRAVELLY SAND		dark brown	F/C SAND and platy GRAVEL	SW				0.2
3	2 4 3 9	1.0 2.0	S-2	SILTY GRAVEL			platy GRAVEL,some Silt	GM				0.2
5	2 8 4 6	0.6 2.0	S-3	Wel-Graded SANO with SiR and Gravet  SILT with Gravel	medium dense	dark	F/C SAND some Silt rounded Gravel  SILT, little rounded Gravel up to 1"	SW-SM	dry	None		0.2
7	3 4 9 6	1.5 2.0	S-4				SILT, some very fine Sand, platy Gravel up to 1"	ML				0.2
9	7 7 9 8	1.8 2.0		Sandy SILT with Gravel		grey	SILT, little Sand, Gravel up to 1"					0.3

TYPE OF DRILLING RIG:	CME 75	_	
METHOD OF ADVANCING BORING:	Hollow-Stem Auger and Air Hammer	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	TE
METHOD OF ROCK CORING:	NA	_	
GROUNDWATER LEVELS:	NA		TETRA TECH
OTHER OBSERVATIONS:			
		BORING NO.: DSY-SB223	Page 1 of 6

20

DEPTH (FEET)		SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.		REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	6 10 12 14	1.5 2.0	S-6		medium dense				dry			0.3
13	16 21 21 24	0.4 2.0	S-7		dense				damp			0.1
15	13 21 23 27	1.7 2.0	S-8	Sandy SILT with Gravel		grey	SILT, little Sand, Gravel up to 1"	ML	dry	None		0.2
17	18 25 22 29	1.9 2.0	S-9		very dense				damp			0.1
19	13 27 31 32	1.4 2.0	S-10						dry			0.1

TYPE OF DRILLING RIG:	CME 75	_	
METHOD OF ADVANCING BORING:	Hollow-Stem Auger and Air Hammer	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	TE
METHOD OF ROCK CORING:	NA	_	
GROUNDWATER LEVELS:	NA		TETRA TECH
OTHER OBSERVATIONS:			
		BORING NO.: DSY-SB223	Page 2 of 6

30

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.		REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
20	31											
	40	2.0 / 2.0	S-11									0.3
21	57											
22	61	/										
	25 38				very							
23	38	1.9/2.0	S-12	Sandy SILT with Gravel	dense		SILT, little Sand, Gravel up to 1"	ML				0.1
	50											
24	12					grey			dry			
	15	2.0 2.0	S-13							None		0.2
25	17		0 13									0.2
26	47											
20	30 24	/										
27	27	2.0 2.0	S-14	SHALE	dense							1.5
	25						Weathered Bedrock - Phyllite	ROCK				
28	19	/					weathered bedrock - rhyllite	NOCK				
	25	2.0 / 2.0	S-15	BEDROCK	medium	grey-			wet			
29	22	2.0/ 2.0	3-13	DEDNOCK	dense	brown			WEL			
	21											

TYPE OF DRILLING RIG:	CME 75		
METHOD OF ADVANCING BORING:	Hollow-Stem Auger and Air Hammer	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon		TE
METHOD OF ROCK CORING:	NA .	_	
GROUNDWATER LEVELS:	NA	_	TETRA TECH
OTHER OBSERVATIONS:		_	
		_	
		BORING NO.: DSY-SB223	Page 3 of 6

DEPTH (FEET)	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.		REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
31 32 33 34	NA 5.0 S-16	S-16	BEDROCK	medium dense	grey- brown	Weathered Bedrock - Phyllite	ROCK	wet	None	Brown water coming up from cuttings. Air hammer advancement indicates very weathered rock, soft rock cuttings, little competant rock cuttings, no odor or sheen observeved	
36 37 38 39	NA 5.0	S-17		dense	dark grey	Phyllite				Gray water coming up from cuttings. Air hammer advancement indicates weathered rock,some competant rock cuttings,no odor or sheen observeved	

TYPE OF DRILLING RIG:	CME 75	_	
METHOD OF ADVANCING BORING:	Hollow-Stem Auger and Air Hammer	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	Tt
METHOD OF ROCK CORING:	<u>N</u> A	_	
GROUNDWATER LEVELS:	NA	<u>-</u>	TETRA TECH
OTHER OBSERVATIONS:		_	
		-	
		BORING NO.: DSY-SB223	Page 4 of 6

50

DEPTH (FEET)	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.		REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
40											
41	NA 2.0	S-18									
42											
43										Horizontal	
44	3.75 5.0	S-19		medium dense		Slighty Weathered Phyillite				Fractures at 42.75',43.25',45' with little rust	
45										oxidized staining - RQD = 0.27	
46			BEDROCK		grey		ROCK	wet	None		
47										Horizontal	
48	NA 3.0	S-20		dense		Phyillite				Fractures at 48.2',50.87' with little rust	
49										oxidized staining - RQD = 0.37	

TYPE OF DRILLING RIG:	CME 75	_	
METHOD OF ADVANCING BORING:	Hollow-Stem Auger and Air Hammer	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	Tt
METHOD OF ROCK CORING:	NA	_	
GROUNDWATER LEVELS:	NA	_	TETRA TECH
OTHER OBSERVATIONS:		_	
		_	
		BORING NO.: DSY-SB223	Page 5 of 6

	D BY:	pany/Drille .EVATION:	:r):	112G02125.SA.DM M. Alroy Technical Drilling Service NA	:es/Gary			START DATE: COMPLETION MON. WELL N CHECKED BY:	ETION DATE: 3/4/2011  NELL NO.: NA				
	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION		USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
51		NA 2.0	S-20 (cont)	BEDROCK	dense		Phyillite		ROCK	Wet	None	Horizontal Fractures at 48.2',50.87' with little rust oxidized staining - RQD = 0.37	
52							EOB - 52.0' bgs						
TYPE OF DRILLING RIG:  METHOD OF ADVANCING BORING:  METHOD OF SOIL SAMPLING:  METHOD OF ROCK CORING:  METHOD OF ROCK CORING:  MA  GROUNDWATER LEVELS:  OTHER OBSERVATIONS:  CME 75  Hollow-Stem Auger and Air Hammer  3" Split-Spoon  NA  NA  NA							TETRA	)					

DSY-SB223

Page 6 of 6

BORING NO.:

BORING NO.: DSY-SB223

NS Newport - Site 19 - On-Shore Derecktor Shipyard

BORING LOG FOR:

BORING LOG FOR:
PROJECT NO.:
112G02125.SA.DM

LOGGED BY:
M. Alroy

DRILLED BY (Company/Driller):
GRD. SURFACE ELEVATION:
NA

NS Newport - Site 19 - On-Shore Derecktor Shipyard

M. Alroy

M. Alroy

Technical Drilling Services/Gary

NA

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DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.		REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	25	/		ASPHALT/PAVEMENT		dark grey	ASPHALT	OTHER				
	49	2.0 / 2.0	S-1	Silty GRAVEL with Sand	dense	uaikgiey	GRAVEL,some Silt,little F/C Sand	GM				
1	20 26		31		delise		F/M SAND,little Silt and Cobbles - Cobbles shattered		dry	None		
2	18 13	2.0 / 2.0	6.3	SILTY SAND	medium	grey		SM	ary	None		
3	15 12	2.0/ 2.0	S-2		dense		F/M SAND,little Silt,trace Gravel					
4	12 15	0.0 / 2.0	S-3									
5	16 13	0.0 / 2.0	5-5									
6	12 11	1.0 / 2.0	S-4		medium			SM	dry			
7	11 9	1.0/ 2.0	5-4	SILTY SAND	dense	grov	F/M SAND,little Silt - crushed cobble @ 6'-8' interval and broken shells @ 8'-18' interval	SIVI	ury	None		
8	6 5	1.4 / 2.0	S-5	SILIT SAINU	loose	grey	ורטאוא, חוגנופ אוג - כרטאוופט נטטטופ ש ס -ס וווגפועמו מווט טוטאפוז אופווא ש א -18 interval	SP	wet	None		
9	3		33		10030			;				

		BORING NO.: DSY-SBMW02A	Page 1 of 3
OTHER OBSERVATIONS:		-	
GROUNDWATER LEVELS:	NA	-	<b>TETRA TECH</b>
METHOD OF ROCK CORING:	NA .	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	TE
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	_	
TYPE OF DRILLING RIG:	CME 75	_	

20

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.		REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	2	/										
11	4	1.4 2.0	S-6		loose							
11	6 2											
12	2											
	3	2.0 / 2.0	S-7									
13	2	2.07 2.0	3-7									
14	3						F/M SAND, little Silt - broken shells					
14	1									None		
15	1	2.0 2.0	S-8	SILTY SAND		grey		SP	wet	None		
	1											
16	2	/			very loose							
17	2	2.0 2.0	S-9									
	2											
18	1	/										
	1	2.0 / 2.0	S-10				Top 1.6' - F/C SAND,little Silt					
19	1		3 10									
	4	/					Bottom 0.6' - F/C SAND,little Silt			Organic - slight		

TYPE OF DRILLING RIG:	CME 75	_	
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	_	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	_	TE
METHOD OF ROCK CORING:	NA		
GROUNDWATER LEVELS:	NA		TETRA TECH
OTHER OBSERVATIONS:			
		BORING NO.: DSY-SBMW02A	Page 2 of 3

BORING LOG FOR:	NS Newport - Site 19 - On-Shore Derecktor Shipyard
PROJECT NO.:	112G02125.SA.DM
LOGGED BY:	M. Alroy
DRILLED BY (Company/Driller):	Technical Drilling Services/Gary
GRD. SURFACE ELEVATION:	NA

 BORING NO.:
 DSY-SBMW02A

 START DATE:
 2/9/2011

 COMPLETION DATE:
 2/9/2011

 MON. WELL NO.:
 NA

 CHECKED BY:
 NA

	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
20	4	2.0 / 2.0	S-11			grey	Top 1' - F/C SAND,little Silt			None		
21	7	2.0 / 2.0	5-11		loose	dark grey	bottom 1'- F/C SAND,-little Silt			Organic - slight		
22	5 10			SILTY SAND	loose	grey	Top 0.7' - F/C SAND, little Silt	SP		None		
23	9	2.0 / 2.0	S-12	SIETT SAIND			Middle 0.3' - F/C SAND.little Silt  Bottom 1'- F/C SAND,little Silt	31	wet	None		
24	12 22 23	2.0   2.0	S-13		medium dense	grey mottling	Top 1.6' - F/C SAND, little Silt			Organic slight		
26	26	/		Poorly Graded GRAVEL with Silt and Sand	•		Bottom 0.4' - GRAVEL,little F/C Sand,little Silt EOB - 26.0' bgs	GM				

TYPE OF DRILLING RIG:
METHOD OF ADVANCING BORING:
METHOD OF SOIL SAMPLING:
METHOD OF SOIL SAMPLING:
METHOD OF ROCK CORING:
METHOD OF ROCK CORING:
MA

OTHER OBSERVATIONS:

BORING NO.: DSY-SBMW02A

Page 3 of 3





## Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT:	Newport NS	DRILLING Co.:	Technical Drilling Svcs	BORING No.:	DSY-MW02
PROJECT No.:	112G02125			DATE COMPLETED	
SITE:	19	DRILLING METHO			161948.18
GEOLOGIST:	Miki Alroy	DEV. METHOD:	Wattera inertial lift pump		379410.29
_			ELEVATION OF TOP OF SUR	•	
		_	STICK -UP TOP OF SURFACE	•	
		1.	ELEVATION OF TOP OF RISE	•	
		1	RISER STICK-UP ABOVE GR		
			- I.D. OF SURFACE CASING:	6"	
			TYPE OF SURFACE CASING:	Stand Pipe	
GROUND V			GROUND ELEVATION (NGVD	29):	10.1'
			TYPE OF SURFACE SEAL:	Concrete	
ELEVATION					
			RISER PIPE I.D.:	2"	
			TYPE OF RISER PIPE:	Schedule 40 PVC	
			- BOREHOLE DIAMETER:	8"	
			TYPE OF SEAL:		
			Cer	nent / Bentonite Grout	
			_ ELEVATION / DEPTH OF SEA	L:	/ 12'
			TYPE OF SEAL:	100% Bentonite	
	8	<b>-</b>	ELEVATION / DEPTH TOP OF	FILTER PACK:	/ 14'
	<b>- 188</b>				
	888 888	₩	_ ELEVATION / DEPTH TOP OF	SCREEN:	/ 16'
		<b>888</b>			
			TYPE OF SCREEN:	2" Sch. 40 Slot PVC	
		₩	THE OF SCILLIN.	2 0011. 40 0101 1 70	
			SLOT SIZE X LENGTH:	0.010" x 10'	
		<b>                                     </b>			
		<b>₩</b>	I.D. OF SCREEN:	2"	
		<b>₩</b>			
		<b>₩</b>			
		<b>188</b> 1			
		<b>188</b>	TYPE OF FILTER PACK:	#1 Silica Sand	
		₩			
		<b>₩</b>			
		<b>₩</b>			
		<b>188</b> 1			
	<b>::::</b> ::::::::::::::::::::::::::::::::	<b>188</b> 1			
		<b>₩</b>			
		<b>₩</b>			
		<del>888  </del>	- ELEVATION / DEPTH BOTTO	M OF SCREEN:	/ 26'
	<b></b>	<del>888                                   </del>	- ELEVATION / DEPTH BOTTO	M OF FILTER PACK:	/ 26'
	<b></b>	<b>***</b>	TYPE OF BACKFILL BELOW		
		<b>***</b>	WELL:	NA	
<u> </u>		<del>"</del>	ELEVATION / DEPTH OF BOR	REHOLE:	/ 26'



WELL No.: DSY-MW204

PROJECT: Nev	vport NS DRILLING Co.	Technical Drilling Services	BORING No.:	DSY-MW204
PROJECT No.: 112	2G02125 DRILLER:	Gary Caouette	DATE COMPLETE	2/9/2011
SITE:	19 DRILLING ME	THO Hollow-Stem Auger	NORTHING:	161829.245
GEOLOGIST: M	liki Alroy DEV. METHOI	D: Wattera inertial lift pump	EASTING:	379641.08
		— Elevation / Depth of Top	of Riser:	/
		— Elevation / Height of Top Surfa	of ace Casing:	/
		I.D. of Surface Casing:	4"	
Ground Elevation = 12 Datum: NGVD 29		Type of Surface Casing:	Flush Mount Road Box	
Datum. NOVD 23		Type of Surface Seal:	Concrete	
		— I.D. of Riser:	2"	
		Type of Riser:	2" Schedule 40 PVC	
		Borehole Diameter:	8"	
	<u>=</u>	Elevation / Depth Top of	Rock:	/ NA
		— Type of Backfill:	Grout/Bentonite Slurry	
		Elevation / Depth of Seal	: <u> </u>	/ 4'
	←	— Type of Seal:	Grout/Bentonite Slurry	
	***	Elevation / Depth of Top	of Filter Pack:	/ 6'
	_	Elevation / Depth of Top	of Screen:	/ 8'
	<u> </u>	Type of Screen:	2" Schedule 40 Slotted	PVC
		Slot Size x Length:	0.010" x 10'	
		I.D. of Screen:	2"	
		Type of Filter Pack:	#1 Silica Sand	
		<ul><li>Elevation / Depth of Botto</li></ul>	om of Screen:	/ 18'
	*	Elevation / Depth of Botto	om of Filter Pack:	/ 18'
		Type of Backfill Below W		
	Not to Scale	Elevation / Total Depth of	f Borehole:	/ 18'



### Tetra Tech NUS, Inc. OVERBURDEN MONITORING WELL SHEET

PROJECT: Newport NS DRILLING Co.: Technical Drilling Svcs **BORING No.:** DSY-MW218 PROJECT No.: 112G02125 DRILLER: Gary Caouette DATE COMPLETED 2/8/2011 SITE: 19 DRILLING METHOD Hollow-Stem Auger NORTHING: 161532.94 **GEOLOGIST:** Wattera inertial lift pump 379578.01 Miki Alroy DEV. METHOD: EASTING: ELEVATION OF TOP OF SURFACE CASING: STICK -UP TOP OF SURFACE CASING: ELEVATION OF TOP OF RISER PIPE: RISER STICK-UP ABOVE GROUND SURFACE: I.D. OF SURFACE CASING: TYPE OF SURFACE CASING: Stand Pipe **GROUND ELEVATION (NGVD 29):** 14' TYPE OF SURFACE SEAL: Concrete RISER PIPE I.D.: TYPE OF RISER PIPE: Schedule 40 PVC 8" BOREHOLE DIAMETER: TYPE OF SEAL: Cement / Bentonite Grout ELEVATION / DEPTH OF SEAL: / 6' 100% Bentonite TYPE OF SEAL: **ELEVATION / DEPTH TOP OF FILTER PACK:** /8' / 10' ELEVATION / DEPTH TOP OF SCREEN: 2" Sch. 40 Slot PVC TYPE OF SCREEN: 0.010" x 10' SLOT SIZE X LENGTH: 2" I.D. OF SCREEN: #1 Silica Sand TYPE OF FILTER PACK: / 20' ELEVATION / DEPTH BOTTOM OF SCREEN: / 20' ELEVATION / DEPTH BOTTOM OF FILTER PACK: TYPE OF BACKFILL BELOW NA WELL: **ELEVATION / DEPTH OF BOREHOLE:** / 20'



### Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT No.: 112602125 DRILLER: Gary Caouette DATE COMPLETED 2/8. SITE: 19 DRILLING METHOD. Hollow-Stem Auger Watter a inertial lift pump EASTING: 3796.  ELEVATION OF TOP OF SURFACE CASING: STICK - UP TOP OF SU	PROJECT:	Newport NS	DRILLING Co.:	Technical Drilling Svcs	BORING No ·	DSY-MW21
SITE: 19 DRILLING METHOD Hollow-Stem Auger MORTHING: 1611: 3796  Wattera inertial lift pump EASTING: 3796  ELEVATION OF TOP OF SURFACE CASING: STICK-UP TOP OF SURFACE CASING: STICK-UP TOP OF SURFACE CASING: STICK-UP TOP OF SURFACE CASING: ELEVATION OF TOP OF RISER PIPE: RISER STICK-UP TOP OF SURFACE CASING: 6' TYPE OF SURFACE CASING: STAND PIPE OF SURFACE CASING: 10.0 of SURFACE CASING: 1779 OF SURFACE CASING: STAND PIPE OF SURFACE CASING: 10.0 of SURFACE CASING: 1779 OF SURFACE SEAL: Concrete RISER PIPE: Schedule 40 PVC  BOREHOLE DIAMETER: 8' TYPE OF SEAL: 100% Bentonite  ELEVATION / DEPTH OF SEAL: 100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK: // E  ELEVATION / DEPTH TOP OF SCREEN: 2' Sch. 40 Slot PVC  SLOT SIZE X LENGTH: 0.010' x 10'  LID. OF SCREEN: 2' Sch. 40 Slot PVC  SLOT SIZE X LENGTH: 0.010' x 10'  LID. OF SCREEN: 2' Sch. 40 Slot PVC  SLOT SIZE X LENGTH: 0.010' x 10'  ELEVATION / DEPTH BOTTOM OF SCREEN: // E  ELEVATION / DEPTH BOTTOM OF FILTER PACK: // E  ELEVATION / DEPTH BOTTOM OF FILTER PACK: // E  ELEVATION / DEPTH BOTTOM OF FILTER PACK: // E  ELEVATION / DEPTH BOTTOM OF FILTER PACK: // E  ELEVATION / DEPTH BOTTOM OF FILTER PACK: // E  ELEVATION / DEPTH BOTTOM OF FILTER PACK: // E  ELEVATION / DEPTH BOTTOM OF FILTER PACK: // E  ELEVATION / DEPTH BOTTOM OF FILTER PACK: // E						
GROUND    Carolind   C						161155.96
STICK JUP TOP OF SURFACE CASING:  ELEVATION OF TOP OF RISER PIPE:  RISER STICK-UP ABOVE GROUND SURFACE:  I.D. OF SURFACE CASING:  TYPE OF SURFACE CASING:  Stand Pipe  GROUND ELEVATION (NGVD 29):  TYPE OF SURFACE SEAL:  Concrete  RISER PIPE I.D.:  TYPE OF RISER PIPE:  Schedule 40 PVC  BOREHOLE DIAMETER:  TYPE OF SEAL:  100% Bentonite  ELEVATION / DEPTH OF SEAL:  TYPE OF SCREEN:  1/8  ELEVATION / DEPTH TOP OF FILTER PACK:  FIVE OF SCREEN:  1/1  TYPE OF SCREEN:  2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH:  1.D. OF SCREEN:  2"  TYPE OF FILTER PACK:  #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  1/2  ELEVATION / DEPTH BOTTOM OF SCREEN:  7/2  ELEVATION / DEPTH BOTTOM OF SCREEN:  1/2  ELEVATION / DEPTH BOTTOM OF SCREEN:  7/2  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  7/2	GEOLOGIST:	Miki Alroy	DEV. METHOD:			379641.90
STICK-UP TOP OF SURFACE CASING:  ELEVATION OF TOP OF RISER PIPE:  RISER STICK-UP ABOVE GROUND SURFACE:  I.D. OF SURFACE CASING:  TYPE OF SURFACE CASING:  TYPE OF SURFACE CASING:  Stand Pipe  GROUND ELEVATION (NGVD 29):  TYPE OF RISER PIPE:  Schedule 40 PVC  BOREHOLE DIAMETER:  TYPE OF SEAL:  Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL:  TYPE OF SEAL:  100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK:  ELEVATION / DEPTH TOP OF SCREEN:  1/1  TYPE OF SCREEN:  2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH:  0.010" x 10"  I.D. OF SCREEN:  2"  TYPE OF FILTER PACK:  #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  7/2  ELEVATION / DEPTH BOTTOM OF SCREEN:  TYPE OF BACKFILL BELOW  ELEVATION / DEPTH BOTTOM OF SCREEN:  7/2						
STICK-UP TOP OF SURFACE CASING:  ELEVATION OF TOP OF RISER PIPE:  RISER STICK-UP ABOVE GROUND SURFACE:  I.D. OF SURFACE CASING:  TYPE OF SURFACE CASING:  TYPE OF SURFACE CASING:  Stand Pipe  GROUND ELEVATION (NGVD 29):  TYPE OF RISER PIPE:  Schedule 40 PVC  BOREHOLE DIAMETER:  8"  TYPE OF SEAL:  Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL:  TYPE OF SCREEN:  2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH:  0.010" x 10"  I.D. OF SCREEN:  2"  TYPE OF FILTER PACK:  #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  7/2  ELEVATION / DEPTH BOTTOM OF SCREEN:  TYPE OF FILTER PACK:  #1 Silica Sand			<b>—</b>	ELEVATION OF TOD OF SUB	EACE CASING:	
ELEVATION OF TOP OF RISER PIPE: RISER STICK-UP ABOVE GROUND SURFACE: ILD. OF SURFACE CASING: GROUND ELEVATION (NGVD 29): TYPE OF SURFACE SEAL: Concrete RISER PIPE I.D.: TYPE OF RISER PIPE: Schedule 40 PVC  BOREHOLE DIAMETER: B" TYPE OF SEAL: Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL: TYPE OF SCREEN: 2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH: 0.010" x 10"  I.D. OF SCREEN: 2"  TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN: TYPE OF FILTER PACK:  #1 Silica Sand		_9				
RISER STICK-UP ABOVE GROUND SURFACE:  I.D. OF SURFACE CASING:  TYPE OF SURFACE CASING:  GROUND ELEVATION (NGVD 29):  TYPE OF SURFACE SEAL:  Concrete  RISER PIPE LD:  TYPE OF RISER PIPE:  Schedule 40 PVC  BOREHOLE DIAMETER:  8"  TYPE OF SEAL:  Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL:  TYPE OF SEAL:  100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK:  ELEVATION / DEPTH TOP OF SCREEN:  TYPE OF SCREEN:  2"  TYPE OF SCREEN:  2"  TYPE OF FILTER PACK:  #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  TYPE OF FILTER PACK:  ELEVATION / DEPTH BOTTOM OF SCREEN:  TYPE OF FILTER PACK:  ELEVATION / DEPTH BOTTOM OF SCREEN:  TYPE OF BACKFILL BELOW  ELEVATION / DEPTH BOTTOM OF SCREEN:  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  TYPE OF BACKFILL BELOW		<b></b>				
GROUND  GROUND ELEVATION (NGVD 29):  TYPE OF SURFACE SEAL:  COncrete  RISER PIPE LD:  RISER PIPE LD:  TYPE OF RISER PIPE:  Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL:  TYPE OF SCREEN:  LEVATION / DEPTH TOP OF FILTER PACK:  TYPE OF SCREEN:  TYPE OF FILTER PACK:  #1 Silica Sand						
GROUND  GROUND ELEVATION (NGVD 29):  TYPE OF SURFACE SEAL:  Concrete  RISER PIPE LD:  TYPE OF RISER PIPE:  Schedule 40 PVC  BOREHOLE DIAMETER:  8"  TYPE OF SEAL:  Cement / Bentonite Grout  ELEVATION / DEPTH FOR SEAL:  TYPE OF SEAL:  100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK:  ELEVATION / DEPTH TOP OF SCREEN:  71  TYPE OF SCREEN:  2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH:  1.0.010" x 10"  1.0. OF SCREEN:  2"  TYPE OF FILTER PACK:  #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  1/2  ELEVATION / DEPTH BOTTOM OF SCREEN:  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  TYPE OF BACKFILL BELDOW  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  TYPE OF BACKFILL BELDOW			<b>1 1 1 1 1 1 1 1 1 1</b>			
ELEVATION  TYPE OF SURFACE SEAL:  RISER PIPE I.D.: TYPE OF RISER PIPE:  Schedule 40 PVC  BOREHOLE DIAMETER: 8" TYPE OF SEAL:  Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL:  TYPE OF SEAL:  100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK:  ELEVATION / DEPTH TOP OF SCREEN:  110 OF SCREEN:  TYPE OF SCREEN:  2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH:  0.010" x 10"  I.D. OF SCREEN:  2"  TYPE OF FILTER PACK:  #1 Silica Sand						•
TYPE OF SURFACE SEAL:  RISER PIPE I.D.: TYPE OF RISER PIPE:  Schedule 40 PVC  BOREHOLE DIAMETER: 8" TYPE OF SEAL:  Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL: TYPE OF SEAL:  100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK:  12"  TYPE OF SCREEN: 2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH: 0.010" x 10'  I.D. OF SCREEN: 2"  TYPE OF FILTER PACK: #1 Silica Sand	`	,		<u>-</u>		
RISER PIPE LD: TYPE OF RISER PIPE:  BOREHOLE DIAMETER: B" TYPE OF SEAL:  Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL:  TYPE OF SEAL:  100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK:  ELEVATION / DEPTH TOP OF SCREEN:  1/1  TYPE OF SCREEN: 2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH:  1.D. OF SCREEN: 2"  TYPE OF FILTER PACK:  #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  2 ELEVATION / DEPTH BOTTOM OF FILTER PACK:  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  TYPE OF BACKFILL BELOW	GROUND					14'
RISER PIPE I.D.: TYPE OF RISER PIPE:  BOREHOLE DIAMETER: B" TYPE OF SEAL:  Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL: TYPE OF SEAL:  100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK:  ELEVATION / DEPTH TOP OF SCREEN:  1100% Sentonite  TYPE OF SCREEN:  2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH: 0.010" x 10'  I.D. OF SCREEN: 2"  TYPE OF FILTER PACK: #1 Silica Sand	ELEVATION	v(		TYPE OF SURFACE SEAL:	Concrete	-
TYPE OF RISER PIPE: Schedule 40 PVC  BOREHOLE DIAMETER: 8" TYPE OF SEAL:  Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL: 100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK: / 8  ELEVATION / DEPTH TOP OF SCREEN: / 1  TYPE OF SCREEN: 2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH: 0.010" x 10'  I.D. OF SCREEN: 2"  TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN: / 2  ELEVATION / DEPTH BOTTOM OF FILTER PACK: / 2  ELEVATION / DEPTH BOTTOM OF FILTER PACK: / 2  TYPE OF BACKFILL BELOW					0.11	-
BOREHOLE DIAMETER: 8" TYPE OF SEAL:  Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL: 100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK: / 8  ELEVATION / DEPTH TOP OF SCREEN: / 1  TYPE OF SCREEN: 2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH: 0.010" x 10'  I.D. OF SCREEN: 2"  TYPE OF FILTER PACK: #1 Silica Sand				-		-
TYPE OF SEAL:    Cement / Bentonite Grout				TYPE OF RISER PIPE:	Schedule 40 PVC	-
TYPE OF SEAL:    Cement / Bentonite Grout				- BOREHOLE DIAMETER:	8"	
Cement / Bentonite Grout  ELEVATION / DEPTH OF SEAL:  TYPE OF SEAL:  100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK:  ELEVATION / DEPTH TOP OF SCREEN:  7/2  TYPE OF SCREEN:  2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH:  0.010" x 10'  I.D. OF SCREEN:  2"  TYPE OF FILTER PACK:  #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  7/2  TYPE OF BACKFILL BELOW				•		-
TYPE OF SEAL: 100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK: /8  ELEVATION / DEPTH TOP OF SCREEN: /1  TYPE OF SCREEN: 2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH: 0.010" x 10'  I.D. OF SCREEN: 2"  TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN: /2  ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW					nent / Bentonite Grout	-
TYPE OF SEAL: 100% Bentonite  ELEVATION / DEPTH TOP OF FILTER PACK: /8  ELEVATION / DEPTH TOP OF SCREEN: /1  TYPE OF SCREEN: 2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH: 0.010" x 10'  I.D. OF SCREEN: 2"  TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN: /2  ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW						-
ELEVATION / DEPTH TOP OF FILTER PACK:    ELEVATION / DEPTH TOP OF SCREEN:   1			<b>—</b>	_ ELEVATION / DEPTH OF SEA		/ 6'
ELEVATION / DEPTH TOP OF SCREEN:  TYPE OF SCREEN:  2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH:  0.010" x 10'  I.D. OF SCREEN:  2"  TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  TYPE OF BACKFILL BELOW			<b>←</b>	TYPE OF SEAL:	100% Bentonite	-
ELEVATION / DEPTH TOP OF SCREEN:  TYPE OF SCREEN:  2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH:  0.010" x 10'  I.D. OF SCREEN:  2"  TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  TYPE OF BACKFILL BELOW						-
ELEVATION / DEPTH TOP OF SCREEN:  TYPE OF SCREEN:  2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH:  0.010" x 10'  I.D. OF SCREEN:  2"  TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  TYPE OF BACKFILL BELOW		<b></b>	₩	ELEVATION / DEPTH TOP OF	FILTER PACK:	/ 8'
TYPE OF SCREEN: 2" Sch. 40 Slot PVC  SLOT SIZE X LENGTH: 0.010" x 10'  I.D. OF SCREEN: 2"  TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN: /2  ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW		- III				7 0
SLOT SIZE X LENGTH:  1.D. OF SCREEN:  TYPE OF FILTER PACK:  #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  TYPE OF BACKFILL BELOW				_ ELEVATION / DEPTH TOP OF	SCREEN:	/ 10'
SLOT SIZE X LENGTH:  1.D. OF SCREEN:  TYPE OF FILTER PACK:  #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  TYPE OF BACKFILL BELOW			<b>₩</b> `			
SLOT SIZE X LENGTH:  1.D. OF SCREEN:  TYPE OF FILTER PACK:  #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN:  ELEVATION / DEPTH BOTTOM OF FILTER PACK:  TYPE OF BACKFILL BELOW			₩			
I.D. OF SCREEN: 2"  TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN: /2  ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW		<b>₩</b>		TYPE OF SCREEN:	2" Sch. 40 Slot PVC	<u>.</u>
I.D. OF SCREEN: 2"  TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN: /2  ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW			<b>333</b>		0.040# 40#	
TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN: /2  ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW			₩	SLOT SIZE X LENGTH:	0.010" x 10 <sup>-</sup>	•
TYPE OF FILTER PACK: #1 Silica Sand  ELEVATION / DEPTH BOTTOM OF SCREEN: /2  ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW				ID OF SCREEN:	2"	
ELEVATION / DEPTH BOTTOM OF SCREEN: /2  — ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW			<b>⋙</b>	I.D. OF SCILLIN.		-
ELEVATION / DEPTH BOTTOM OF SCREEN: /2  — ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW			<b>※</b>			
ELEVATION / DEPTH BOTTOM OF SCREEN: /2  — ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW						
ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW			<b>⋙</b>	TYPE OF FILTER PACK:	#1 Silica Sand	_
ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW			<b>※</b>			_
ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW						
ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW			<b>888</b>			
ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW			₩			
ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW			<b>188</b> 1			
ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW			<b>***</b>			
ELEVATION / DEPTH BOTTOM OF FILTER PACK: /2  TYPE OF BACKFILL BELOW			<b>₩</b>	— ELEVATION / DEDTU DOTTO	M OF SCREEN.	/ 20'
TYPE OF BACKFILL BELOW						/ 20'
		<b></b>	<b>***</b>		VI OF FILTER PACK:	/ 20
, <u> </u>			<b>※</b>		NA	
			₩			/ 20'
	•					



WELL No.: DSY-MW220

PROJECT:	Newport NS	DRILLING Co.	Technical Drilling Services	BORING No.:	DSY-MW220
PROJECT No.:	112G02125	DRILLER:	Gary Caouette	DATE COMPLETE_	2/10/2011
SITE:	19	DRILLING METH	IO Hollow-Stem Auger	NORTHING:	162294.825
GEOLOGIST:	Miki Alroy	DEV. METHOD:	Wattera inertial lift pump	EASTING:	379304.622
	Γ		- Elevation / Depth of Top	of Riser:	/
			<ul> <li>Elevation / Height of Top Surfa</li> </ul>	of ace Casing:	
			I.D. of Surface Casing:	4"	
Ground Elevation = Datum: NGVD 2	9.6		Type of Surface Casing:	Flush Mount Road Box	(
			Type of Surface Seal:	Concrete	
			- I.D. of Riser:	2"	
			Type of Riser:	Schedule 40 PVC	
			Borehole Diameter:	8"	
	=   =	= <del> </del>	- Elevation / Depth Top of	Rock:	/ NA
			- Type of Backfill:	Grout/Bentonite Slurry	,
			- Elevation / Depth of Seal	: <u> </u>	/ 1.5'
		•	- Type of Seal:	Grout/Bentonite Slurry	
	888	4	- Elevation / Depth of Top	of Filter Pack:	/ 3.5'
	<u> </u>	- 88	- Elevation / Depth of Top	of Screen:	/ 5'
		- -	Type of Screen:	2" Schedule 40 Slotted	I PVC
		- - -	Slot Size x Length:	0.010" x 15'	
		- 1888 - 1888 - 1888	I.D. of Screen:	2"	
		- - -	- Type of Filter Pack:	#1 Silica Sand	
			- Elevation / Depth of Botto	om of Screen:	/ 20'
			Elevation / Depth of Bott	om of Filter Pack:	/ 20'
			Type of Backfill Below W	/ell: NA	
	Not to	Scale	- Elevation / Total Depth o	f Borehole:	/ 20'
Footnotes:		l l			

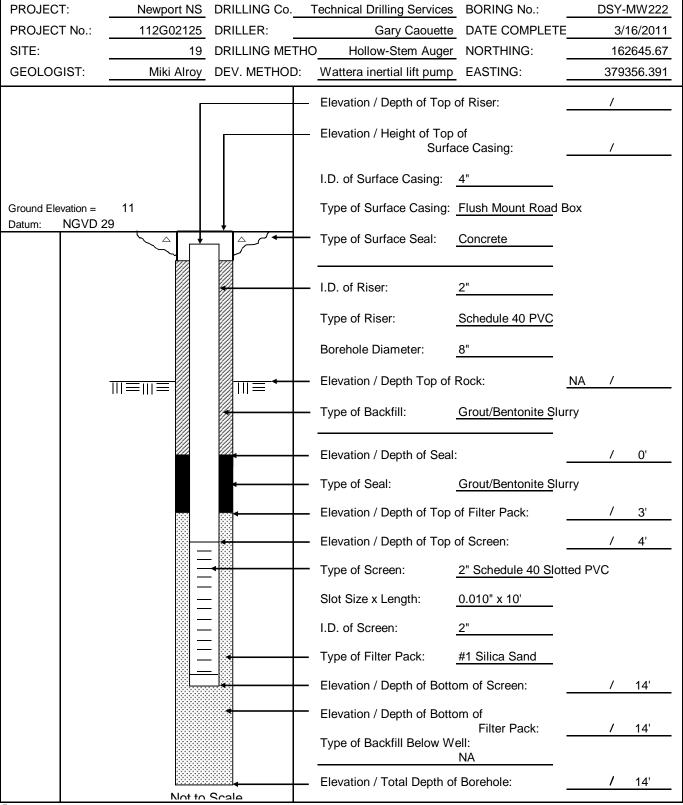


WELL No.: DSY-MW221

PROJECT: DSY-MW221 Newport NS DRILLING Co. Technical Drilling Services BORING No.: PROJECT No.: 2/14/2011 112G02125 DRILLER: Gary Caouette DATE COMPLETE SITE: DRILLING METHO Hollow-Stem Auger NORTHING: 162439.068 GEOLOGIST: Miki Alroy DEV. METHOD: Wattera inertial lift pump EASTING: 379372.542 Elevation / Depth of Top of Riser: Elevation / Height of Top of Surface Casing: I.D. of Surface Casing: Type of Surface Casing: Flush Mount Road Box Ground Elevation = 10 NGVD 29 Datum: Type of Surface Seal: Concrete I.D. of Riser: Schedule 40 PVC Type of Riser: Borehole Diameter: Elevation / Depth Top of Rock: NA  $\Pi \equiv \Pi \equiv$ Type of Backfill: Grout/Bentonite Slurry Elevation / Depth of Seal: 0' Type of Seal: Grout/Bentonite Slurry Elevation / Depth of Top of Filter Pack: Elevation / Depth of Top of Screen: 3' Type of Screen: 2" Schedule 40 Slotted PVC Slot Size x Length: 0.010" x 12' I.D. of Screen: Type of Filter Pack: #1 Silica Sand Elevation / Depth of Bottom of Screen: 15' Elevation / Depth of Bottom of Filter Pack: 15' Type of Backfill Below Well: Elevation / Total Depth of Borehole: 16' Not to Scale



WELL No.: DSY-MW222



Footnotes:



WELL No.: DSY-MW223

PROJECT No.:   112G02125   DRILLER:   Gary Caouette   DATE COMPLETE   3/4/2011	PROJECT:	Newport NS	DRILLING Co.	Technical Drilling Services	BORING No.:	DSY-MW223
Common   C	PROJECT No.:	112G02125	DRILLER:	Gary Caouette	DATE COMPLETE	3/4/2011
Elevation / Depth of Top of Riser:	SITE:	19	DRILLING METH	IO Hollow-Stem Auger	NORTHING:	162730.395
Elevation / Height of Top of Surface Casing:	GEOLOGIST:	Miki Alroy	DEV. METHOD:	Wattera inertial lift pump	EASTING:	379643.815
Surface Casing: /  I.D. of Surface Casing: 4*  Type of Surface Casing: Flush Mount Road Box  Type of Riser: Schedule 40 PVC  Borehole Diameter: 8*  Elevation / Depth of Seal:		Γ		- Elevation / Depth of Top	of Riser:	/
Type of Surface Casing: Flush Mount Road Box  Type of Surface Seal: Concrete  I.D. of Riser: 2" Type of Riser: Schedule 40 PVC  Borehole Diameter: 8"  Elevation / Depth Top of Rock: NA /  Type of Backfill: Grout/Bentonite Slurry  Elevation / Depth of Top of Filter Pack: / 39'  Elevation / Depth of Top of Screen: / 41'  Type of Screen: 2" Schedule 40 Slotted PVC  Slot Size x Length: 0.010" x 10' I.D. of Screen: 2"  Type of Backfill Below Well:  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'  Elevation / Depth of Bottom of Screen: / 51'						/
Type of Surface Seal:   Concrete				I.D. of Surface Casing:	4"	
Type of Surface Seal: Concrete    I.D. of Riser: 2"   Type of Riser: Schedule 40 PVC   Borehole Diameter: 8"   Elevation / Depth Top of Rock: NA /   Type of Backfill: Grout/Bentonite Slurry   Elevation / Depth of Seal: / 37'   Type of Saal: Grout/Bentonite Slurry   Elevation / Depth of Top of Filter Pack: / 39'   Elevation / Depth of Top of Screen: / 41'   Type of Screen: 2" Schedule 40 Slotted PVC   Slot Size x Length: 0.010" x 10'   I.D. of Screen: 2"   Type of Filter Pack: #1 Silica Sand   Elevation / Depth of Bottom of Screen: / 51'   Elevation / Depth of Bottom of Screen: / 51'   Type of Backfill Below Well: NA   Elevation / Total Depth of Borehole: / 51'   Type of Backfill Below Well: NA   Elevation / Total Depth of Borehole: / 51'   Type of Backfill Below Type of Borehole: / 51'   Type of Backfill Below Type of Borehole: / 51'   Type of Backfill Below Type of Borehole: / 51'   Type of Backfill Below Type of Borehole: / 51'   Type of Backfill Below Type of Borehole: / 51'   Type of Backfill Below Type of Borehole: / 51'   Type of Backfill Below Type of Borehole: / 51'   Type of Backfill Below Type of Borehole: / 51'   Type of Backfill Below Type of Borehole: / 51'   Type of Backfill Below Type of Borehole: / 51'   Type of Backfill Below Type of Borehole: / 51'   Type of Backfill Below Type of Backfill Type of Backfill Below Type of Backfill Type of Backf		-		Type of Surface Casing:	Flush Mount Road Box	<
Type of Riser:  Borehole Diameter:  Elevation / Depth Top of Rock:  Type of Backfill:  Grout/Bentonite Slurry  Elevation / Depth of Seal:  Type of Seal:  Grout/Bentonite Slurry  Elevation / Depth of Top of Filter Pack:  Type of Screen:  Type of Screen:  Type of Screen:  2"  Type of Screen:  Type of Filter Pack:  Type of Filter Pack:  Type of Filter Pack:  Elevation / Depth of Bottom of Screen:  Type of Backfill Below Well:  NA  Elevation / Total Depth of Borehole:  Filter Pack:  Type of Backfill Below Well:  NA  Elevation / Total Depth of Borehole:  Filter Pack:  Type of Backfill Below Well:  NA  Elevation / Total Depth of Borehole:  Filter Pack:  Type of Backfill Below Well:  Type of Backfill Below Well:  Schedule 40 PVC  A1'  A1'  Type of Filter Pack:  Filter Pack:  Type of Backfill Below Well:  NA  Elevation / Total Depth of Borehole:  Filter Pack:  Type of Backfill Below Well:  Type of Backfill Below Well:	Datum: NG VD 2			Type of Surface Seal:	Concrete	
Borehole Diameter: 8"  Elevation / Depth Top of Rock: NA /  Type of Backfill: Grout/Bentonite Slurry  Elevation / Depth of Seal: / 37'  Type of Seal: Grout/Bentonite Slurry  Elevation / Depth of Top of Filter Pack: / 39'  Elevation / Depth of Top of Screen: / 41'  Type of Screen: 2" Schedule 40 Slotted PVC  Slot Size x Length: 0.010" x 10'  I.D. of Screen: 2"  Type of Filter Pack: #1 Silica Sand  Elevation / Depth of Bottom of Filter Pack: / 51'  Type of Backfill Below Well: NA  Elevation / Total Depth of Borehole: / 51'				- I.D. of Riser:	2"	
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Type of Backfill: Grout/Bentonite Slurry    Elevation / Depth of Seal: / 37'				Borehole Diameter:	8"	
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Not to Scale			0.010	Elevation / Total Depth of	f Borehole:	/ 51'

Coordinate system - NAD 1983 SPCS Rhode Island (Feet)

# APPENDIX C FIELD MODIFICATION RECORDS

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## TETRA TECH NUS, INC. FIELD MODIFICATION RECORD

	00	2
Site Name:	On-Shore Derecktor	
Project Numb	er: 112 602125	Task Assignment: FI.WI
		Date:
Description:	Adjustment of monitoring well loca	Ations MW-220, MW-221, MW-222
		where determined not to be
	in the field	
· · · · · · · · · · · · · · · · · · ·		
		и .
		-221, and MW-222, and MW-11
had to	be adjusted because of	on going waterfront
Recommende	d Action: <u>Re-lucate</u> Monit	oring well locations
MUV-221.	and MW-222 to west	edge of access road, Re-
locate M	W-220 south away from a	ctive construction zone
		Date:
Disposition/Act	tion: Minituring well locations	4 be adjusted to positions
		ewed by Navy and regulators
		The state of the s
Project Manag	er (Signature):	Date:
Distribution:	Program Manager:	Others as Required:
	Project Manager:	
	Quality Assurance Officer:	
	Field Operations Leader:	
	Project File:	

Tt	TETRA TECH NUS, INC.	
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### FIELD MODIFICATION RECORD

		602	
h d	Op- Shore Derecktor		
Project Numb	per: 112 60 2125	Task Assignmer	nt: FI, WI
То:	Location:		Date:
Description:_	Up gradient grant mater	monitorias well le	pation installed
in bedi	ock quift		
	hange: Overbuilen ground u		,
installat	in of minitering well	1 location MW-	723. Aprifer
is consi	there waterfront area	poted with overbuil	un aquifer
	ed Action: Siceen Minito		hadesel
	A Action. Street Manager	IN WALL IN LUK	n a winds
aprifer			
Field Operation	ons Leader (Signature):		Date:
Disposition/Ad	ction: Mw-223 installed	l as a bedrock	nell.
Project Manaç	ger (Signature):		Date:
Distribution:	Program Manager:		Others as Required:
	Project Manager:		
	Quality Assurance Officer:		
	Field Operations Leader:		
	Project File:		

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## TETRA TECH NUS, INC. FIELD MODIFICATION RECORD

	6	03
Site Name: _		Location:
Project Numb	per:	Task Assignment:
		Date:
Description:	Munitoring well MW-11 was	reinstalled using DPT
in the	original location.	
Reason for Cl	hange MW-11 could not be re	e-located. Pipsumpd destroyed.
		is in active construction zone.
over burd	en provide water and	advanced for collection of
Recommende	d Action: MW-11a Installe	d or weekend Cor
	•	. Well renamed to
h	e MW-11.	
		Date:
Disposition/Ac	tion: MW-1/2 approved	Quinstallation
Project Manag	er (Signature):	Date:
Distribution:	Program Manager:	Others as Required:
	Project Manager:	
	Quality Assurance Officer:	
	Field Operations Leader:	
	Project File:	

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## TRA TECH NUS, INC. FIELD MODIFICATION RECORD

	604		
Site Name: _	me: Location:		
Project Numb	per: Task Assi	ignment:	
То:	Location:	Date:	
Description:_	Listorie MW-02 could not be	located, Decision	
made to	re-install monitoring woll in	surveyed location	
Reason for C	hange: MW-02 could not be 1e-locat	fed	
	ed Action: Reinstall MW-02 and 1		
Field Operation	ons Leader (Signature):	Date:	
Disposition/Ac	etion: MW-02A installed to rep	11c4 MW-02	
Project Manaç	ger (Signature):	Date:	
Distribution:	Program Manager: Project Manager: Quality Assurance Officer: Field Operations Leader: Project File:	Others as Required:	

- 7	

## TETRA TECH NUS, INC. FIELD MODIFICATION RECORD

		005		
Site Name: _			Location:	
Project Numb	oer:			t:
Description:_	Munitaring mel	MW-219 location	adjusted to	o the
!			=	
-				
Reason for C	hange: The original	inal location wa	s in a rest	ricted
	almory) and			
_ vtilitie	and the second s			
Docommende				
	ed Action:Mw-211			0(1)104
176 47 2 3 4 4				<del></del>
Field Operatio	ns Leader (Signature):			Data:
Disposition/Ac	tion: <u>MW-211</u>	installed in r	ecommended	Area.
Project Manag	er (Signature):			Date:
		_		
Distribution:	Program Manager: Project Manager:			Others as Required:
	Quality Assurance Office	cer:		_
	Field Operations Leade			
	Project File:			

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## TETRA TECH NUS, INC. FIELD MODIFICATION RECORD

		006		
Site Name:				
H	nber:			
B .				
	Sample SB-218	<del></del>		
Avea	was ie-nam	ned 58-224		
	Change: <u>Samplu</u> na			
Recommend	led Action:	hange SB-218	to SB-224	
Field Operati	ions Leader (Signature):		Date:	
Disposition/A	ction: Sample 11	me approved		
Project Mana	ger (Signature):		Date:	
Distribution:	Program Manager: Project Manager: Quality Assurance Officer Field Operations Leader: Project File:	:	Others as	s Required:

### APPENDIX D GW-001 EPA REGION I LOW-FLOW SOP

### U.S. ENVIRONMENTAL PROTECTION AGENCY REGION I

# LOW STRESS (low flow) PURGING AND SAMPLING PROCEDURE FOR THE COLLECTION OF GROUNDWATER SAMPLES FROM MONITORING WELLS

Quality Assurance Unit
U.S. Environmental Protection Agency – Region 1
11 Technology Drive
North Chelmsford, MA 01863

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Prepared by: Charles Porfert, Quality Assurance Unit)

| Date | Date | Prepared by: Charles Porfert, Quality Assurance Unit) | Date | D

Approved by: Jerevel Solvery 1-19-16 (Gerard Sotolongo, Quality Assurance Unit) Date

#### **Revision Page**

Date	Rev #	Summary of changes	Sections
7/30/96	2	Finalized	
01/19/10	3	Updated	All sections
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#### **USE OF TERMS**

Equipment blank: The equipment blank shall include the pump and the pump's tubing. If tubing is dedicated to the well, the equipment blank needs only to include the pump in subsequent sampling rounds. If the pump and tubing are dedicated to the well, the equipment blank is collected prior to its placement in the well. If the pump and tubing will be used to sample multiple wells, the equipment blank is normally collected after sampling from contaminated wells and not after background wells.

<u>Field duplicates</u>: Field duplicates are collected to determine precision of the sampling procedure. For this procedure, collect duplicate for each analyte group in consecutive order (VOC original, VOC duplicate, SVOC original, SVOC duplicate, etc.).

<u>Indicator field parameters</u>: This SOP uses field measurements of turbidity, dissolved oxygen, specific conductance, temperature, pH, and oxidation/reduction potential (ORP) as indicators of when purging operations are sufficient and sample collection may begin.

Matrix Spike/Matrix Spike Duplicates: Used by the laboratory in its quality assurance program. Consult the laboratory for the sample volume to be collected.

<u>Poteniometric Surface</u>: The level to which water rises in a tightly cased well constructed in a confined aquifer. In an unconfined aquifer, the potentiometric surface is the water table.

**QAPP**: Quality Assurance Project Plan

SAP: Sampling and Analysis Plan

SOP: Standard operating procedure

<u>Stabilization</u>: A condition that is achieved when all indicator field parameter measurements are sufficiently stable (as described in the "Monitoring Indicator Field Parameters" section) to allow sample collection to begin.

<u>Temperature blank</u>: A temperature blank is added to each sample cooler. The blank is measured upon receipt at the laboratory to assess whether the samples were properly cooled during transit.

<u>Trip blank (VOCs)</u>: Trip blank is a sample of analyte-free water taken to the sampling site and returned to the laboratory. The trip blanks (one pair) are added to each sample cooler that contains VOC samples.

#### **SCOPE & APPLICATION**

The goal of this groundwater sampling procedure is to collect water samples that reflect the total mobile organic and inorganic loads (dissolved and colloidal sized fractions) transported through the subsurface under ambient flow conditions, with minimal physical and chemical alterations from sampling operations. This standard operating procedure (SOP) for collecting groundwater samples will help ensure that the project's data quality objectives (DQOs) are met under certain low-flow conditions.

The SOP emphasizes the need to minimize hydraulic stress at the well-aquifer interface by maintaining low water-level drawdowns, and by using low pumping rates during purging and sampling operations. Indicator field parameters (e.g., dissolved oxygen, pH, etc.) are monitored during purging in order to determine when sample collection may begin. Samples properly collected using this SOP are suitable for analysis of groundwater contaminants (volatile and semi-volatile organic analytes, dissolved gases, pesticides, PCBs, metals and other inorganics), or naturally occurring analytes. This SOP is based on Puls, and Barcelona (1996).

This procedure is designed for monitoring wells with an inside diameter (1.5-inches or greater) that can accommodate a positive lift pump with a screen length or open interval ten feet or less and with a water level above the top of the screen or open interval (Hereafter, the "screen or open interval" will be referred to only as "screen interval"). This SOP is not applicable to other well-sampling conditions.

While the use of dedicated sampling equipment is not mandatory, dedicated pumps and tubing can reduce sampling costs significantly by streamlining sampling activities and thereby reducing the overall field costs.

The goal of this procedure is to emphasize the need for consistency in deploying and operating equipment while purging and sampling monitoring wells during each sampling event. This will help to minimize sampling variability.

This procedure describes a general framework for groundwater sampling. Other site specific information (hydrogeological context, conceptual site model (CSM), DQOs, etc.) coupled with systematic planning must be added to the procedure in order to develop an appropriate site specific SAP/QAPP. In addition, the site specific SAP/QAPP must identify the specific equipment that will be used to collect the groundwater samples.

This procedure does not address the collection of water or free product samples from wells containing free phase LNAPLs and/or DNAPLs (light or dense non-aqueous phase

liquids). For this type of situation, the reader may wish to check: Cohen, and Mercer (1993) or other pertinent documents.

This SOP is to be used when collecting groundwater samples from monitoring wells at all Superfund, Federal Facility and RCRA sites in Region 1 under the conditions described herein. Request for modification of this SOP, in order to better address specific situations at individual wells, must include adequate technical justification for proposed changes. All changes and modifications must be approved and included in a revised SAP/QAPP before implementation in field.

#### BACKGROUND FOR IMPLEMENTATION

It is expected that the monitoring well screen has been properly located (both laterally and vertically) to intercept existing contaminant plume(s) or along flow paths of potential contaminant migration. Problems with inappropriate monitoring well placement or faulty/improper well installation cannot be overcome by even the best water sampling procedures. This SOP presumes that the analytes of interest are moving (or will potentially move) primarily through the more permeable zones intercepted by the screen interval.

Proper well construction, development, and operation and maintenance cannot be overemphasized. The use of installation techniques that are appropriate to the hydrogeologic setting of the site often prevent "problem well" situations from occurring. During well development, or redevelopment, tests should be conducted to determine the hydraulic characteristics of the monitoring well. The data can then be used to set the purging/sampling rate, and provide a baseline for evaluating changes in well performance and the potential need for well rehabilitation. Note: if this installation data or well history (construction and sampling) is not available or discoverable, for all wells to be sampled, efforts to build a sampling history should commence with the next sampling event.

The pump intake should be located within the screen interval and at a depth that will remain under water at all times. It is recommended that the intake depth and pumping rate remain the same for all sampling events. The mid-point or the lowest historical midpoint of the saturated screen length is often used as the location of the pump intake. For new wells, or for wells without pump intake depth information, the site's SAP/QAPP must provide clear reasons and instructions on how the pump intake depth(s) will be selected, and reason(s) for the depth(s) selected. If the depths to top and bottom of the well screen are not known, the SAP/QAPP will need to describe how the sampling depth will be determined and how the data can be used.

Stabilization of indicator field parameters is used to indicate that conditions are suitable for sampling to begin. Achievement of turbidity levels of less than 5 NTU, and stable drawdowns of less than 0.3 feet, while desirable, are not mandatory. Sample collection

may still take place provided the indicator field parameter criteria in this procedure are met. If after 2 hours of purging indicator field parameters have not stabilized, one of three optional courses of action may be taken: a) continue purging until stabilization is achieved, b) discontinue purging, do not collect any samples, and record in log book that stabilization could not be achieved (documentation must describe attempts to achieve stabilization), c) discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization (note: there is a risk that the analytical data obtained, especially metals and strongly hydrophobic organic analytes, may reflect a sampling bias and therefore, the data may not meet the data quality objectives of the sampling event).

It is recommended that low-flow sampling be conducted when the air temperature is above 32°F (0°C). If the procedure is used below 32°F, special precautions will need to be taken to prevent the groundwater from freezing in the equipment. Because sampling during freezing temperatures may adversely impact the data quality objectives, the need for water sample collection during months when these conditions are likely to occur should be evaluated during site planning and special sampling measures may need to be developed. Ice formation in the flow-through-cell will cause the monitoring probes to act erratically. A transparent flow-through-cell needs to be used to observe if ice is forming in the cell. If ice starts to form on the other pieces of the sampling equipment, additional problems may occur.

#### **HEALTH & SAFETY**

When working on-site, comply with all applicable OSHA requirements and the site's health/safety procedures. All proper personal protection clothing and equipment are to be worn. Some samples may contain biological and chemical hazards. These samples should be handled with suitable protection to skin, eyes, etc.

#### **CAUTIONS**

The following cautions need to be considered when planning to collect groundwater samples when the below conditions occur.

If the groundwater degasses during purging of the monitoring well, dissolved gases and VOCs will be lost. When this happens, the groundwater data for dissolved gases (e.g., methane, ethene, ethane, dissolved oxygen, etc.) and VOCs will need to be qualified. Some conditions that can promote degassing are the use of a vacuum pump (e.g., peristaltic pumps), changes in aperture along the sampling tubing, and squeezing/pinching the pump's tubing which results in a pressure change.

When collecting the samples for dissolved gases and VOCs analyses, avoid aerating the groundwater in the pump's tubing. This can cause loss of the dissolved gases and VOCs in

the groundwater. Having the pump's tubing completely filled prior to sampling will avoid this problem when using a centrifugal pump or peristaltic pump.

Direct sun light and hot ambient air temperatures may cause the groundwater in the tubing and flow-through-cell to heat up. This may cause the groundwater to degas which will result in loss of VOCs and dissolved gases. When sampling under these conditions, the sampler will need to shade the equipment from the sunlight (e.g., umbrella, tent, etc.). If possible, sampling on hot days, or during the hottest time of the day, should be avoided. The tubing exiting the monitoring well should be kept as short as possible to avoid the sun light or ambient air from heating up the groundwater.

Thermal currents in the monitoring well may cause vertical mixing of water in the well bore. When the air temperature is colder than the groundwater temperature, it can cool the top of the water column. Colder water which is denser than warm water sinks to the bottom of the well and the warmer water at the bottom of the well rises, setting up a convention cell. "During low-flow sampling, the pumped water may be a mixture of convecting water from within the well casing and aquifer water moving inward through the screen. This mixing of water during low-flow sampling can substantially increase equilibration times, can cause false stabilization of indicator parameters, can give false indication of redox state, and can provide biological data that are not representative of the aquifer conditions" (Vroblesky 2007).

Failure to calibrate or perform proper maintenance on the sampling equipment and measurement instruments (e.g., dissolved oxygen meter, etc.) can result in faulty data being collected.

Interferences may result from using contaminated equipment, cleaning materials, sample containers, or uncontrolled ambient/surrounding air conditions (e.g., truck/vehicle exhaust nearby).

Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment and/or proper planning to avoid ambient air interferences. Note that the use of dedicated sampling equipment can also significantly reduce the time needed to complete each sampling event, will promote consistency in the sampling, and may reduce sampling bias by having the pump's intake at a constant depth.

Clean and decontaminate all sampling equipment prior to use. All sampling equipment needs to be routinely checked to be free from contaminants and equipment blanks collected to ensure that the equipment is free of contaminants. Check the previous equipment blank data for the site (if they exist) to determine if the previous cleaning procedure removed the contaminants. If contaminants were detected and they are a concern, then a more vigorous cleaning procedure will be needed.

#### PERSONNEL QUALIFICATIONS

All field samplers working at sites containing hazardous waste must meet the requirements of the OSHA regulations. OSHA regulations may require the sampler to take the 40 hour OSHA health and safety training course and a refresher course prior to engaging in any field activities, depending upon the site and field conditions.

The field samplers must be trained prior to the use of the sampling equipment, field instruments, and procedures. Training is to be conducted by an experienced sampler before initiating any sampling procedure.

The entire sampling team needs to read, and be familiar with, the site Health and Safety Plan, all relevant SOPs, and SAP/QAPP (and the most recent amendments) before going onsite for the sampling event. It is recommended that the field sampling leader attest to the understanding of these site documents and that it is recorded.

#### **EQUIPMENT AND SUPPLIES**

#### A. Informational materials for sampling event

A copy of the current Health and Safety Plan, SAP/QAPP, monitoring well construction data, location map(s), field data from last sampling event, manuals for sampling, and the monitoring instruments' operation, maintenance, and calibration manuals should be brought to the site.

#### B. Well keys.

#### C. Extraction device

Adjustable rate, submersible pumps (e.g., centrifugal, bladder, etc.) which are constructed of stainless steel or Teflon are preferred. Note: if extraction devices constructed of other materials are to be used, adequate information must be provided to show that the substituted materials do not leach contaminants nor cause interferences to the analytical procedures to be used. Acceptance of these materials must be obtained before the sampling event.

If bladder pumps are selected for the collection of VOCs and dissolved gases, the pump setting should be set so that one pulse will deliver a water volume that is sufficient to fill a 40 mL VOC vial. This is not mandatory, but is considered a "best practice". For the proper operation, the bladder pump will need a minimum amount of water above the pump; consult the manufacturer for the recommended submergence. The pump's recommended submergence value should be determined during the planning stage, since it may influence well construction and placement of dedicated pumps where water-level fluctuations are significant.

Adjustable rate, peristaltic pumps (suction) are to be used with caution when collecting samples for VOCs and dissolved gases (e.g., methane, carbon dioxide, etc.) analyses. Additional information on the use of peristaltic pumps can be found in Appendix A. If peristaltic pumps are used, the inside diameter of the rotor head tubing needs to match the inside diameter of the tubing installed in the monitoring well.

Inertial pumping devices (motor driven or manual) are not recommended. These devices frequently cause greater disturbance during purging and sampling, and are less easily controlled than submersible pumps (potentially increasing turbidity and sampling variability, etc.). This can lead to sampling results that are adversely affected by purging and sampling operations, and a higher degree of data variability.

#### D. Tubing

Teflon or Teflon-lined polyethylene tubing are preferred when sampling is to include VOCs, SVOCs, pesticides, PCBs and inorganics. Note: if tubing constructed of other materials is to be used, adequate information must be provided to show that the substituted materials do not leach contaminants nor cause interferences to the analytical procedures to be used. Acceptance of these materials must be obtained before the sampling event.

PVC, polypropylene or polyethylene tubing may be used when collecting samples for metal and other inorganics analyses.

The use of 1/4 inch or 3/8 inch (inside diameter) tubing is recommended. This will help ensure that the tubing remains liquid filled when operating at very low pumping rates when using centrifugal and peristaltic pumps.

Silastic tubing should be used for the section around the rotor head of a peristaltic pump. It should be less than a foot in length. The inside diameter of the tubing used at the pump rotor head must be the same as the inside diameter of tubing placed in the well. A tubing connector is used to connect the pump rotor head tubing to the well tubing. Alternatively, the two pieces of tubing can be connected to each other by placing the one end of the tubing inside the end of the other tubing. The tubing must not be reused.

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#### E. The water level measuring device

Electronic "tape", pressure transducer, water level sounder/level indicator, etc. should be capable of measuring to 0.01 foot accuracy. Recording pressure transducers, mounted above the pump, are especially helpful in tracking water levels during pumping operations, but their use must include check measurements with a water level "tape" at the start and end of each sampling event.

#### F. Flow measurement supplies

Graduated cylinder (size according to flow rate) and stopwatch usually will suffice.

Large graduated bucket used to record total water purged from the well.

#### G. Interface probe

To be used to check on the presence of free phase liquids (LNAPL, or DNAPL) before purging begins (as needed).

#### H. Power source (generator, nitrogen tank, battery, etc.)

When a gasoline generator is used, locate it downwind and at least 30 feet from the well so that the exhaust fumes do not contaminate samples.

#### I. Indicator field parameter monitoring instruments

Use of a multi-parameter instrument capable of measuring pH, oxidation/reduction potential (ORP), dissolved oxygen (DO), specific conductance, temperature, and coupled with a flow-through-cell is required when measuring all indicator field parameters, except turbidity. Turbidity is collected using a separate instrument. Record equipment/instrument identification (manufacturer, and model number).

Transparent, small volume flow-through-cells (e.g., 250 mLs or less) are preferred. This allows observation of air bubbles and sediment buildup in the cell, which can interfere with the operation of the monitoring instrument probes, to be easily detected. A small volume cell facilitates rapid turnover of water in the cell between measurements of the indicator field parameters.

It is recommended to use a flow-through-cell and monitoring probes from the same manufacturer and model to avoid <u>incompatibility</u> between the probes and flow-through-cell.

Turbidity samples are collected before the flow-through-cell. A "T" connector coupled with a valve is connected between the pump's tubing and flow-through-cell. When a turbidity measurement is required, the valve is opened to allow the groundwater to flow into a container. The valve is closed and the container sample is then placed in the turbidimeter.

Standards are necessary to perform field calibration of instruments. A minimum of two standards are needed to bracket the instrument measurement range for all parameters except ORP which use a Zobell solution as a standard. For dissolved oxygen, a wet sponge used for the 100% saturation and a zero dissolved oxygen solution are used for the calibration.

Barometer (used in the calibration of the Dissolved Oxygen probe) and the conversion formula to convert the barometric pressure into the units of measure used by the Dissolved Oxygen meter are needed.

#### J. Decontamination supplies

Includes (for example) non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.

#### K. Record keeping supplies

Logbook(s), well purging forms, chain-of-custody forms, field instrument calibration forms, etc.

#### L. Sample bottles

- M. Sample preservation supplies (as required by the analytical methods)
- N. Sample tags or labels

#### O. PID or FID instrument

If appropriate, to detect VOCs for health and safety purposes, and provide qualitative field evaluations.

#### P. Miscellaneous Equipment

Equipment to keep the sampling apparatus shaded in the summer (e.g., umbrella) and from freezing in the winter. If the pump's tubing is allowed to heat up in the warm weather, the cold groundwater may degas as it is warmed in the tubing.

#### **EQUIPMENT/INSTRUMENT CALIBRATION**

Prior to the sampling event, perform maintenance checks on the equipment and instruments according to the manufacturer's manual and/or applicable SOP. This will ensure that the equipment/instruments are working properly before they are used in the field.

Prior to sampling, the monitoring instruments must be calibrated and the calibration documented. The instruments are calibrated using U.S Environmental Protection Agency Region 1 Calibration of Field Instruments (temperature, pH, dissolved oxygen, conductivity/specific conductance, oxidation/reduction [ORP], and turbidity), January 19, 2010, or latest version or from one of the methods listed in 40CFR136, 40CFR141 and SW-846.

The instruments shall be calibrated at the beginning of each day. If the field measurement falls outside the calibration range, the instrument must be re-calibrated so that all measurements fall within the calibration range. At the end of each day, a calibration check is performed to verify that instruments remained in calibration throughout the day. This check is performed while the instrument is in measurement mode, not calibration mode. If the field instruments are being used to monitor the natural attenuation parameters, then a calibration check at mid-day is highly recommended to ensure that the instruments did not drift out of calibration. Note: during the day if the instrument reads zero or a negative number for dissolved oxygen, pH, specific conductance, or turbidity (negative value only), this indicates that the instrument drifted out of calibration or the instrument is malfunctioning. If this situation occurs the data from this instrument will need to be qualified or rejected.

#### PRELIMINARY SITE ACTIVITIES (as applicable)

Check the well for security (damage, evidence of tampering, missing lock, etc.) and record pertinent observations (include photograph as warranted).

If needed lay out sheet of clean polyethylene for monitoring and sampling equipment, unless equipment is elevated above the ground (e.g., on a table, etc.).

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Remove well cap and if appropriate measure VOCs at the rim of the well with a PID or FID instrument and record reading in field logbook or on the well purge form.

If the well casing does not have an established reference point (usually a V-cut or indelible mark in the well casing), make one. Describe its location and record the date of the mark in the logbook (consider a photographic record as well). All water level measurements must be recorded relative to this reference point (and the altitude of this point should be determined using techniques that are appropriate to site's DQOs.

If water-table or potentiometric surface map(s) are to be constructed for the sampling event, perform synoptic water level measurement round (in the shortest possible time) before any purging and sampling activities begin. If possible, measure water level depth (to 0.01 ft.) and total well depth (to 0.1 ft.) the day before sampling begins, in order to allow for re-settlement of any particulates in the water column. This is especially important for those wells that have not been recently sampled because sediment buildup in the well may require the well to be redeveloped. If measurement of total well depth is not made the day before, it should be measured after sampling of the well is complete. All measurements must be taken from the established referenced point. Care should be taken to minimize water column disturbance.

Check newly constructed wells for the presence of LNAPLs or DNAPLs before the initial sampling round. If none are encountered, subsequent check measurements with an interface probe may not be necessary unless analytical data or field analysis signal a worsening situation. This SOP cannot be used in the presence of LNAPLs or DNAPLs. If NAPLs are present, the project team must decide upon an alternate sampling method. All project modifications must be approved and documented prior to implementation.

If available check intake depth and drawdown information from previous sampling event(s) for each well. Duplicate, to the extent practicable, the intake depth and extraction rate (use final pump dial setting information) from previous event(s). If changes are made in the intake depth or extraction rate(s) used during previous sampling event(s), for either portable or dedicated extraction devices, record new values, and explain reasons for the changes in the field logbook.

#### PURGING AND SAMPLING PROCEDURE

Purging and sampling wells in order of increasing chemical concentrations (known or anticipated) are preferred.

The use of dedicated pumps is recommended to minimize artificial mobilization and entrainment of particulates each time the well is sampled. Note that the use of dedicated sampling equipment can also significantly reduce the time needed to complete each

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sampling event, will promote consistency in the sampling, and may reduce sampling bias by having the pump's intake at a constant depth.

#### A. Initial Water Level

Measure the water level in the well before installing the pump if a non-dedicated pump is being used. The initial water level is recorded on the purge form or in the field logbook.

#### B. Install Pump

Lower pump, safety cable, tubing and electrical lines slowly (to minimize disturbance) into the well to the appropriate depth (may not be the mid-point of the screen/open interval). The Sampling and Analysis Plan/Quality Assurance Project Plan should specify the sampling depth (used previously), or provide criteria for selection of intake depth for each new well. If possible keep the pump intake at least two feet above the bottom of the well, to minimize mobilization of particulates present in the bottom of the well.

Pump tubing lengths, above the top of well casing should be kept as short as possible to minimize heating the groundwater in the tubing by exposure to sun light and ambient air temperatures. Heating may cause the groundwater to degas, which is unacceptable for the collection of samples for VOC and dissolved gases analyses.

#### C. Measure Water Level

Before starting pump, measure water level. Install recording pressure transducer, if used to track drawdowns, to initialize starting condition.

#### D. Purge Well

From the time the pump starts purging and until the time the samples are collected, the purged water is discharged into a graduated bucket to determine the total volume of groundwater purged. This information is recorded on the purge form or in the field logbook.

Start the pump at low speed and slowly increase the speed until discharge occurs. Check water level. Check equipment for water leaks and if present fix or replace the affected equipment. Try to match pumping rate used during previous sampling event(s). Otherwise, adjust pump speed until there is little or no water level drawdown. If the minimal drawdown that can be achieved exceeds 0.3 feet, but remains stable, continue purging.

Monitor and record the water level and pumping rate every five minutes (or as appropriate) during purging. Record any pumping rate adjustments (both time and flow rate). Pumping rates should, as needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. Adjustments are best made in the first fifteen minutes of pumping in order to help minimize purging time. During pump start-up, drawdown may exceed the 0.3 feet target and then "recover" somewhat as pump flow adjustments are made. Purge volume calculations should utilize stabilized drawdown value, not the initial drawdown. If the initial water level is above the top of the screen do not allow the water level to fall into the well screen. The final purge volume must be greater than the stabilized drawdown volume plus the pump's tubing volume. If the drawdown has exceeded 0.3 feet and stabilizes, calculate the volume of water between the initial water level and the stabilized water level. Add the volume of the water which occupies the pump's tubing to this calculation. This combined volume of water needs to be purged from the well after the water level has stabilized before samples are collected.

Avoid the use of constriction devices on the tubing to decrease the flow rate because the constrictor will cause a pressure difference in the water column. This will cause the groundwater to degas and result in a loss of VOCs and dissolved gasses in the groundwater samples.

Note: the flow rate used to achieve a stable pumping level should remain constant while monitoring the indicator parameters for stabilization and while collecting the samples.

Wells with low recharge rates may require the use of special pumps capable of attaining very low pumping rates (e.g., bladder, peristaltic), and/or the use of dedicated equipment. For new monitoring wells, or wells where the following situation has not occurred before, if the recovery rate to the well is less than 50 mL/min., or the well is being essentially dewatered during purging, the well should be sampled as soon as the water level has recovered sufficiently to collect the volume needed for all anticipated samples. The project manager or field team leader will need to make the decision when samples should be collected, how the sample is to be collected, and the reasons recorded on the purge form or in the field logbook. A water level measurement needs to be performed and recorded before samples are collected. If the project manager decides to collect the samples using the pump, it is best during this recovery period that the pump intake tubing not be removed, since this will aggravate any turbidity problems. Samples in this specific situation may be collected without stabilization of indicator field parameters. Note that field conditions and efforts to overcome problematic situations must be recorded in order to support field decisions to deviate from normal procedures described in this SOP. If this type of problematic situation persists in a well, then water sample collection should be changed to a passive or no-purge method, if consistent with the site's DQOs, or have a new well installed.

#### E. Monitor Indicator Field Parameters

After the water level has stabilized, connect the "T" connector with a valve and the flow-through-cell to monitor the indicator field parameters. If excessive turbidity is anticipated or encountered with the pump startup, the well may be purged for a while without connecting up the flow-through-cell, in order to minimize particulate buildup in the cell (This is a judgment call made by the sampler). Water level drawdown measurements should be made as usual. If possible, the pump may be installed the day before purging to allow particulates that were disturbed during pump insertion to settle.

During well purging, monitor indicator field parameters (turbidity, temperature, specific conductance, pH, ORP, DO) at a frequency of five minute intervals or greater. The pump's flow rate must be able to "turn over" at least one flow-through-cell volume between measurements (for a 250 mL flow-through-cell with a flow rate of 50 mLs/min., the monitoring frequency would be every five minutes; for a 500 mL flow-through-cell it would be every ten minutes). If the cell volume cannot be replaced in the five minute interval, then the time between measurements must be increased accordingly. Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments followed by stabilization of indicator parameters. Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings are within the following limits:

Turbidity (10% for values greater than 5 NTU; if three Turbidity values are less than 5 NTU, consider the values as stabilized),

**Dissolved Oxygen** (10% for values greater than 0.5 mg/L, if three Dissolved Oxygen values are less than 0.5 mg/L, consider the values as stabilized),

Specific Conductance (3%), Temperature (3%), pH (± 0.1 unit), Oxidation/Reduction Potential (±10 millivolts).

All measurements, except turbidity, must be obtained using a flow-through-cell. Samples for turbidity measurements are obtained before water enters the flow-through-cell. Transparent flow-through-cells are preferred, because they allow field personnel to watch for particulate build-up within the cell. This build-up may affect indicator field parameter values measured within the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities. Record start and stop times and give a brief description of cleaning activities.

The flow-through-cell must be designed in a way that prevents gas bubble entrapment in the cell. Placing the flow-through-cell at a 45 degree angle with the port facing upward can help remove bubbles from the flow-through-cell (see Appendix B Low-Flow Setup Diagram). All during the measurement process, the flow-through-cell must remain free of any gas bubbles. Otherwise, the monitoring probes may act erratically. When the pump is turned off or cycling on/off (when using a bladder pump), water in the cell must not drain out. Monitoring probes must remain submerged in water at all times.

#### F. Collect Water Samples

When samples are collected for laboratory analyses, the pump's tubing is disconnected from the "T" connector with a valve and the flow-through-cell. The samples are collected directly from the pump's tubing. Samples must not be collected from the flow-through-cell or from the "T" connector with a valve.

VOC samples are normally collected first and directly into pre-preserved sample containers. However, this may not be the case for all sampling locations; the SAP/QAPP should list the order in which the samples are to be collected based on the project's objective(s). Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

If the pump's flow rate is too high to collect the VOC/dissolved gases samples, collect the other samples first. Lower the pump's flow rate to a reasonable rate and collect the VOC/dissolved gases samples and record the new flow rate.

During purging and sampling, the centrifugal/peristaltic pump tubing must remain filled with water to avoid aeration of the groundwater. It is recommended that 1/4 inch or 3/8 inch (inside diameter) tubing be used to help insure that the sample tubing remains water filled. If the pump tubing is not completely filled to the sampling point, use the following procedure to collect samples: collect non-VOC/dissolved gases samples first, then increase flow rate slightly until the water completely fills the tubing, collect the VOC/dissolved gases samples, and record new drawdown depth and flow rate.

For bladder pumps that will be used to collect VOC or dissolved gas samples, it is recommended that the pump be set to deliver long pulses of water so that one pulse will fill a 40 mL VOC vial.

Use pre-preserved sample containers or add preservative, as required by analytical methods, to the samples immediately after they are collected. Check the analytical methods (e.g. EPA SW-846, 40 CFR 136, water supply, etc.) for additional information on preservation.

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If determination of filtered metal concentrations is a sampling objective, collect filtered water samples using the same low flow procedures. The use of an in-line filter (transparent housing preferred) is required, and the filter size (0.45  $\mu$ m is commonly used) should be based on the sampling objective. Pre-rinse the filter with groundwater prior to sample collection. Make sure the filter is free of air bubbles before samples are collected. Preserve the filtered water sample immediately. Note: filtered water samples are not an acceptable substitute for unfiltered samples when the monitoring objective is to obtain chemical concentrations of total mobile contaminants in groundwater for human health or ecological risk calculations.

Label each sample as collected. Samples requiring cooling will be placed into a cooler with ice or refrigerant for delivery to the laboratory. Metal samples after acidification to a pH less than 2 do not need to be cooled.

#### G. Post Sampling Activities

If a recording pressure transducer is used to track drawdown, re-measure water level with tape.

After collection of samples, the pump tubing may be dedicated to the well for re-sampling (by hanging the tubing inside the well), decontaminated, or properly discarded.

Before securing the well, measure and record the well depth (to 0.1 ft.), if not measured the day before purging began. Note: measurement of total well depth annually is usually sufficient after the initial low stress sampling event. However, a greater frequency may be needed if the well has a "silting" problem or if confirmation of well identity is needed.

Secure the well.

#### **DECONTAMINATION**

Decontaminate sampling equipment prior to use in the first well and then following sampling of each well. Pumps should not be removed between purging and sampling operations. The pump, tubing, support cable and electrical wires which were in contact with the well should be decontaminated by one of the procedures listed below.

The use of dedicated pumps and tubing will reduce the amount of time spent on decontamination of the equipment. If dedicated pumps and tubing are used, only the initial sampling event will require decontamination of the pump and tubing.

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Note if the previous equipment blank data showed that contaminant(s) were present after using the below procedure or the one described in the SAP/QAPP, a more vigorous procedure may be needed.

#### Procedure 1

Decontaminating solutions can be pumped from either buckets or short PVC casing sections through the pump and tubing. The pump may be disassembled and flushed with the decontaminating solutions. It is recommended that detergent and alcohol be used sparingly in the decontamination process and water flushing steps be extended to ensure that any sediment trapped in the pump is removed. The pump exterior and electrical wires must be rinsed with the decontaminating solutions, as well. The procedure is as follows:

Flush the equipment/pump with potable water.

Flush with non-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.

Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.

Optional - flush with isopropyl alcohol (pesticide grade; must be free of ketones {e.g., acetone}) or with methanol. This step may be required if the well is highly contaminated or if the equipment blank data from the previous sampling event show that the level of contaminants is significant.

Flush with distilled/deionized water. This step must remove all traces of alcohol (if used) from the equipment. The final water rinse must not be recycled.

#### Procedure 2

Steam clean the outside of the submersible pump.

Pump hot potable water from the steam cleaner through the inside of the pump. This can be accomplished by placing the pump inside a three or four inch diameter PVC pipe with end cap. Hot water from the steam cleaner jet will be directed inside the PVC pipe and the pump exterior will be cleaned. The hot water from the steam cleaner will then be pumped from the PVC pipe through the pump and collected into another container. Note: additives or solutions should not be added to the steam cleaner.

Pump non-phosphate detergent solution through the inside of the pump. If the solution is recycled, the solution must be changed periodically.

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Pump potable water through the inside of the pump to remove all of the detergent solution. If the solution is recycled, the solution must be changed periodically.

Pump distilled/deionized water through the pump. The final water rinse must not be recycled.

#### FIELD QUALITY CONTROL

Quality control samples are required to verify that the sample collection and handling process has not compromised the quality of the groundwater samples. All field quality control samples must be prepared the same as regular investigation samples with regard to sample volume, containers, and preservation. Quality control samples include field duplicates, equipment blanks, matrix spike/matrix spike duplicates, trip blanks (VOCs), and temperature blanks.

#### FIELD LOGBOOK

A field log shall be kept to document all groundwater field monitoring activities (see Appendix C, example table), and record the following for each well:

Site name, municipality, state.

Well identifier, latitude-longitude or state grid coordinates.

Measuring point description (e.g., north side of PVC pipe).

Well depth, and measurement technique.

Well screen length.

Pump depth.

Static water level depth, date, time and measurement technique.

Presence and thickness of immiscible liquid (NAPL) layers and detection method.

Pumping rate, drawdown, indicator parameters values, calculated or measured total volume pumped, and clock time of each set of measurements.

Type of tubing used and its length.

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Type of pump used.

Clock time of start and end of purging and sampling activity.

Types of sample bottles used and sample identification numbers.

Preservatives used.

Parameters requested for analyses.

Field observations during sampling event.

Name of sample collector(s).

Weather conditions, including approximate ambient air temperature.

QA/QC data for field instruments.

Any problems encountered should be highlighted.

Description of all sampling/monitoring equipment used, including trade names, model number, instrument identification number, diameters, material composition, etc.

#### DATA REPORT

Data reports are to include laboratory analytical results, QA/QC information, field indicator parameters measured during purging, field instrument calibration information, and whatever other field logbook information is needed to allow for a full evaluation of data usability.

Note: the use of trade, product, or firm names in this sampling procedure is for descriptive purposes only and does not constitute endorsement by the U.S. EPA.

#### REFERENCES

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Robert W. Puls and Michael J. Barcelona, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, April 1996 (EPA/540/S-95/504).

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Vroblesky, Don A., Clifton C. Casey, and Mark A. Lowery, Summer 2007, Influence of Dissolved Oxygen Convection on Well Sampling, *Ground Water Monitoring & Remediation* 27, no. 3: 49-58.

### APPENDIX A PERISTALTIC PUMPS

Before selecting a peristaltic pump to collect groundwater samples for VOCs and/or dissolved gases (e.g., methane, carbon dioxide, etc.) consideration should be given to the following:

• The decision of whether or not to use a peristaltic pump is dependent on the intended use of the data.

 If the additional sampling error that may be introduced by this device is NOT of concern for the VOC/dissolved gases data's intended use, then this device may be

acceptable.

• If minor differences in the groundwater concentrations could effect the decision, such as to continue or terminate groundwater cleanup or whether the cleanup goals have been reached, then this device should NOT be used for VOC/dissolved gases sampling. In these cases, centrifugal or bladder pumps are a better choice for more accurate results.

EPA and USGS have documented their concerns with the use of the peristaltic pumps to collect water sample in the below documents.

• "Suction Pumps are not recommended because they may cause degassing, pH modification, and loss of volatile compounds" *A Compendium of Superfund Field Operations Methods*, EPA/540/P-87/001, December 1987.

• "The agency does not recommend the use of peristaltic pumps to sample ground water particularly for volatile organic analytes" *RCRA Ground-Water Monitoring Draft Technical Guidance*, EPA Office of Solid Waste, November 1992.

• "The peristaltic pump is limited to shallow applications and can cause degassing resulting in alteration of pH, alkalinity, and volatiles loss", *Low-flow (Minimal drawdown) Ground-Water Sampling Procedures*, by Robert Puls & Michael Barcelona, April 1996, EPA/540/S-95/504.

• "Suction-lift pumps, such as peristaltic pumps, can operate at a very low pumping rate; however, using negative pressure to lift the sample can result in the loss of volatile analytes", USGS Book 9 Techniques of Water-Resources Investigation, Chapter A4. (Version 2.0, 9/2006).

#### APPENDIX B

#### SUMMARY OF SAMPLING INSTRUCTIONS

These instructions are for using an adjustable rate, submersible pump or a peristaltic pump with the pump's intake placed at the midpoint of a 10 foot or less well screen or an open interval. The water level in the monitoring well is above the top of the well screen or open interval, the ambient temperature is above 32°F, and the equipment is not dedicated. Field instruments are already calibrated. The equipment is setup according to the diagram at the end of these instructions.

- 1. Review well installation information. Record well depth, length of screen or open interval, and depth to top of the well screen. Determine the pump's intake depth (e.g., mid-point of screen/open interval).
- 2. On the day of sampling, check security of the well casing, perform any safety checks needed for the site, lay out a sheet of polyethylene around the well (if necessary), and setup the equipment. If necessary a canopy or an equivalent item can be setup to shade the pump's tubing and flow-through-cell from the sun light to prevent the sun light from heating the groundwater.
- 3. Check well casing for a reference mark. If missing, make a reference mark. Measure the water level (initial) to 0.01 ft. and record this information.
- 4. Install the pump's intake to the appropriate depth (e.g., midpoint) of the well screen or open interval. Do not turn-on the pump at this time.
- 5. Measure water level and record this information.
- 6. Turn-on the pump and discharge the groundwater into a graduated waste bucket. Slowly increase the flow rate until the water level starts to drop. Reduce the flow rate slightly so the water level stabilizes. Record the pump's settings. Calculate the flow rate using a graduated container and a stop watch. Record the flow rate. Do not let the water level drop below the top of the well screen.

If the groundwater is highly turbid or colored, continue to discharge the water into the bucket until the water clears (visual observation); this usually takes a few minutes. The turbid or colored water is usually from the well being disturbed during the pump installation. If the water does not clear, then you need to make a choice whether to continue purging the well (hoping that it will clear after a reasonable time) or continue to

the next step. Note, it is sometimes helpful to install the pump the day before the sampling event so that the disturbed materials in the well can settle out.

If the water level drops to the top of the well screen during the purging of the well, stop purging the well, and do the following:

Wait for the well to recharge to a sufficient volume so samples can be collected. This may take awhile (pump maybe removed from well, if turbidity is not a problem). The project manager will need to make the decision when samples should be collected and the reasons recorded in the site's log book. A water level measurement needs to be performed and recorded before samples are collected. When samples are being collected, the water level must not drop below the top of the screen or open interval. Collect the samples from the pump's tubing. Always collect the VOCs and dissolved gases samples first. Normally, the samples requiring a small volume are collected before the large volume samples are collected just in case there is not sufficient water in the well to fill all the sample containers. All samples must be collected, preserved, and stored according to the analytical method. Remove the pump from the well and decontaminate the sampling equipment.

If the water level has dropped 0.3 feet or less from the initial water level (water level measure before the pump was installed); proceed to Step 7. If the water level has dropped more than 0.3 feet, calculate the volume of water between the initial water level and the stabilized water level. Add the volume of the water which occupies the pump's tubing to this calculation. This combined volume of water needs to be purged from the well after the water level has stabilized before samples are be collected.

7. Attach the pump's tubing to the "T" connector with a valve (or a three-way stop cock). The pump's tubing from the well casing to the "T" connector must be as short as possible to prevent the groundwater in the tubing from heating up from the sun light or from the ambient air. Attach a short piece of tubing to the other end of the end of the "T" connector to serve as a sampling port for the turbidity samples. Attach the remaining end of the "T" connector to a short piece of tubing and connect the tubing to the flow-through-cell bottom port. To the top port, attach a small piece of tubing to direct the water into a calibrated waste bucket. Fill the cell with the groundwater and remove all gas bubbles from the cell. Position the flow-through-cell in such a way that if gas bubbles enter the cell they can easily exit the cell. If the ports are on the same side of the cell and the cell is cylindrical shape, the cell can be placed at a 45-degree angle with the ports facing upwards; this position should keep any gas bubbles entering the cell away from the monitoring probes and allow the gas bubbles to exit the cell easily (see Low-Flow Setup Diagram). Note,

make sure there are no gas bubbles caught in the probes' protective guard; you may need to shake the cell to remove these bubbles.

- 8. Turn-on the monitoring probes and turbidity meter.
- 9. Record the temperature, pH, dissolved oxygen, specific conductance, and oxidation/reduction potential measurements. Open the valve on the "T" connector to collect a sample for the turbidity measurement, close the valve, do the measurement, and record this measurement. Calculate the pump's flow rate from the water exiting the flow-through-cell using a graduated container and a stop watch, and record the measurement. Measure and record the water level. Check flow-through-cell for gas bubbles and sediment; if present, remove them.
- 10. Repeat Step 9 every 5 minutes or as appropriate until monitoring parameters stabilized. Note at least one flow-through-cell volume must be exchanged between readings. If not, the time interval between readings will need to be increased. Stabilization is achieved when three consecutive measurements are within the following limits:

**Turbidity** (10% for values greater than 5 NTUs; if three Turbidity values are less than 5 NTUs, consider the values as stabilized),

**Dissolved Oxygen** (10% for values greater than 0.5 mg/L, if three Dissolved Oxygen values are less than 0.5 mg/L, consider the values as stabilized),

Specific Conductance (3%), Temperature (3%), pH (± 0.1 unit), Oxidation/Reduction Potential (±10 millivolts).

If these stabilization requirements do not stabilize in a reasonable time, the probes may have been coated from the materials in the groundwater, from a buildup of sediment in the flow-through-cell, or a gas bubble is lodged in the probe. The cell and the probes will need to be cleaned. Turn-off the probes (not the pump), disconnect the cell from the "T" connector and continue to purge the well. Disassemble the cell, remove the sediment, and clean the probes according to the manufacturer's instructions. Reassemble the cell and connect the cell to the "T" connector. Remove all gas bubbles from the cell, turn-on the probes, and continue the measurements. Record that the time the cell was cleaned.

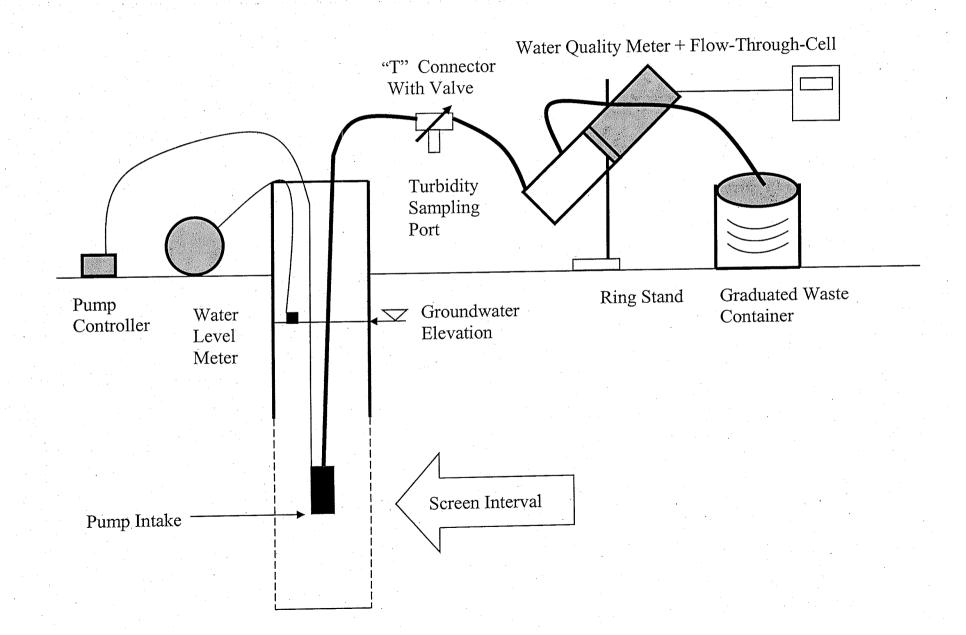
11. When it is time to collect the groundwater samples, turn-off the monitoring probes, and disconnect the pump's tubing from the "T" connector. If you are using a centrifugal or peristaltic pump check the pump's tubing to determine if the tubing is completely filled with water (no air space).

All samples must be collected and preserved according to the analytical method. VOCs and dissolved gases samples are normally collected first and directly into pre-preserved sample containers. However, this may not be the case for all sampling locations; the SAP/QAPP should list the order in which the samples are to be collected based on the project's objective(s). Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

If the pump's tubing is not completely filled with water and the samples are being collected for VOCs and/or dissolved gases analyses using a centrifugal or peristaltic pump, do the following:

All samples must be collected and preserved according to the analytical method. The VOCs and the dissolved gases (e.g., methane, ethane, ethene, and carbon dioxide) samples are collected last. When it becomes time to collect these samples increase the pump's flow rate until the tubing is completely filled. Collect the samples and record the new flow rate.

- 12. Store the samples according to the analytical method.
- 13. Record the total purged volume (graduated waste bucket). Remove the pump from the well and decontaminate the sampling equipment.



### APPENDIX C EXAMPLE (Minimum Requirements) WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Well Nun Field Pers	sonnel ; Organizati		)Date			Depth to of screen (below MP) top bottom Pump Intake at (ft. below MP) Purging Device; (pump type) Total Volume Purged						
Clock Time 24 HR	Water Depth below MP ft	Pump Dial <sup>1</sup>	Purge Rate ml/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond. <sup>2</sup> μS/cm	рН	ORP <sup>3</sup> mv	DO mg/L	Turb- idity NTU	Comments	
											×	
•	:					,						
		-										
-												
							<u> </u>					
			, '					·				
Stabilizat	l tion Criteria	<u>l</u>			3%	3%	±0.1	± 10 mv	10%	10%		

1. Pump dial setting (for example: hertz, cycles/min, etc).

μSiemens per cm(same as μmhos/cm)at 25°C.
 Oxidation reduction potential (ORP)

### APPENDIX E 2011 ANALYTICAL DATA RESULTS

E-1 SURFACE SOIL SAMPLE ANALYTICAL DATA

# APPENDIX E-1 ANALYTICAL RESULTS - SURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 of 8

SAMPLE ID						DSY-SB204-		DSY-SB206-	DSY-SB207-	DSY-SO-	DSY-SO-	DSY-SO-SB208	
				SO-0002	SO-0002-D	SO-0002-AVG	SO-0002	SO-0002	SO-0002	SB208-000.5	SB208-000.5-D	000.5-AVG	SB209-0.30.7
TARGET AREA				HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP- 14 AREA			
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				0 FT	0 FT	0 FT	0.3 FT						
BOTTOM DEPTH				2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT					
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL
SUBMATRIX				SS	SS	SS	SS						
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	870000	540000	540000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA NA	NA NA
1,1,2,2-TETRACHLOROETHANE	560	1300	560	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA NA	NA NA
1,1,2-TRICHLOROETHANE	1100	3600	1100	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
1,1-DICHLOROETHANE	3300	920000	3300	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA NA	NA NA
1,1-DICHLOROETHENE	24000	200	200	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
1,2,4-TRICHLOROBENZENE	22000	96000	22000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
1,2-DIBROMO-3-CHLOROPROPANE	5.4	500	5.4	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 UJ	NA NA	. NA	NA	NA NA
1,2-DIBROMOETHANE	34	10	10	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
1,2-DICHLOROBENZENE	190000	510000	190000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
1,2-DICHLOROETHANE	430	900	430	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
1,2-DICHLOROPROPANE	890	1900	890	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
1,3-DICHLOROBENZENE		430000	430000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
1,4-DICHLOROBENZENE	2400	27000	2400	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA NA	NA NA
2-BUTANONE	2800000	10000000	2800000	5.52 U	3.26 J	3.01 J	5.43 U	3.92 U	4.17 U	NA	. NA	NA	NA NA
2-HEXANONE	21000		21000	2.76 U	4.96 J	3.17 J	2.72 U	1.96 U	2.09 U	NA	. NA	NA NA	NA NA
4-METHYL-2-PENTANONE	530000	1200000	530000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
ACETONE	6100000	7800000	6100000	11 UJ	31.4 J	18.4 J	27.3 J	9.96 J	16.5 J	NA	. NA	NA	NA NA
BENZENE	1100	2500	1100	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA NA	
BROMODICHLOROMETHANE	270	10000	270	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
BROMOFORM	61000	81000	61000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
BROMOMETHANE	730	800	730	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	. NA	NA	NA NA
CARBON DISULFIDE	82000		82000	2.76 U	2.5 U	2.63 U	3.28 J	1.96 U	2.09 U	NA	. NA	NA	
CARBON TETRACHLORIDE	610	1500	610	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	
CHLOROBENZENE	29000	210000	29000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA
CHLORODIBROMOMETHANE	680	7600	680	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA NA	NA NA
CHLOROETHANE	1500000		1500000	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	. NA	NA	
CHLOROFORM	290	1200	290	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	
CHLOROMETHANE	12000		12000	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	. NA	NA	NA NA
CIS-1,2-DICHLOROETHENE	16000	630000	16000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	
CIS-1,3-DICHLOROPROPENE	1700		1700	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	. NA	NA	NA NA

# APPENDIX E-1 ANALYTICAL RESULTS - SURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 of 8

	T	1	1	DOV 00004	DOV ODGG	Inov open	DOV ODGOS	DOV 00000	DOV 00007	Inov oo	DOV 00	DOV 00 0000	lnov oo
SAMPLE ID				DSY-SB204- SO-0002	DSY-SB204- SO-0002-D	DSY-SB204- SO-0002-AVG	DSY-SB205-	DSY-SB206- SO-0002	DSY-SB207- SO-0002	DSY-SO- SB208-000.5	DSY-SO- SB208-000.5-D	DSY-SO-SB208	SB209-0.30.7
				30-0002	30-0002-D	30-0002-AVG	30-0002	30-0002	30-0002	36200-000.3	3B208-000.3-D	000.5-AVG	36209-0.30.7
TARGET AREA				HUTS 1	HUTS 1	HUTS 1 AND	HUTS 1	HUTS 1	HUTS 1	BLDG. 6 - TP-	BLDG. 6 - TP-	BLDG. 6 - TP-	BLDG. 6 - TP-
				AND 2	AND 2	2	AND 2	AND 2	AND 2	14 AREA	14 AREA	14 AREA	14 AREA
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.3 FT
BOTTOM DEPTH				2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL
SUBMATRIX				SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE NCx0 1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM
VOLATILES (UG/KG) Cont.												ı	
CYCLOHEXANE	700000		700000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA NA	NA NA
DICHLORODIFLUOROMETHANE	18000		18000	5.52 UJ	5 UJ	5.26 UJ	5.43 UJ	3.92 UJ	4.17 UJ	NA	NA	NA.	NA NA
ETHYLBENZENE	5400	71000	5400	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA NA
ISOPROPYLBENZENE	210000	27000	27000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	N/	NA NA
M+P-XYLENES				5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	NA	NA.	NA NA
METHYL ACETATE	7800000		7800000	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	NA	NA	NA NA
METHYL CYCLOHEXANE				2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA.	NA NA
METHYL TERT-BUTYL ETHER	43000	390000	43000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA NA	NA NA
METHYLENE CHLORIDE	11000	45000	11000	9.69 UJ	10.5 U	10.1 UJ	9.67 UJ	4.31 UJ	7.26 UJ	NA	NA	NA NA	NA NA
O-XYLENE	380000		380000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	N/A	NA NA
STYRENE	630000	13000	13000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	N/	NA NA
TETRACHLOROETHENE	550	12000	550	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	N/	NA NA
TOLUENE	500000	190000	190000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA NA
TOTAL 1,2-DICHLOROETHENE	70000	630000	70000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA NA
TOTAL XYLENES	63000	110000	63000	8.28 U	7.5 U	7.89 U	8.15 U	5.88 U	6.26 U	NA	NA	NA	
TRANS-1,2-DICHLOROETHENE	15000		15000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA NA
TRANS-1,3-DICHLOROPROPENE	1700		1700	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	
TRICHLOROETHENE	2800	13000	2800	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	
TRICHLOROFLUOROMETHANE	79000		79000	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	NA	NA	
VINYL CHLORIDE	60	20	20	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG)													
2-METHYLNAPHTHALENE	31000	123000	31000	18 U	17.9 U	18 U	18.9 U	3.56 U	14.5 J	33.1 J	18.8 J	26 .	299
ACENAPHTHENE	340000	43000	43000	18 U	17.9 U	18 U	17.8 J	3.56 U	17.2 U	36.7 J	10 J	23.4	1000
ACENAPHTHYLENE	340000	23000	23000	18 U	17.9 U	18 U	19.9 J	3.56 U	17.2 U	3.97 U	3.94 U	3.96 U	695
ANTHRACENE	1700000	35000	35000	18 U	17.9 U	18 U	51.1	3.56 U	17.2 U	45.1 J	3.94 UJ	23.5	2290
BENZO(A)ANTHRACENE	150	900	150	22.5 J	17.9 UJ	15.7 J	232 J	3.56 UJ	31.8 J	149 J	51.5 J	100 .	5740
BENZO(A)PYRENE	15	400	15	14.5 J	17.9 U	11.7 J	165	3.56 U	29.6 J	129 J	46.3 J	87.6	4920
BENZO(B)FLUORANTHENE	150	900	150	22.1 J	17.9 U	15.5 J	263	3.56 U	54	194 J	67.4 J	131 .	7120
BENZO(G,H,I)PERYLENE	170000	800	800	18 U	17.9 U	18 U	119	1.92 J	25.8 J	59.5 J	28.4 J	44 .	2070
BENZO(K)FLUORANTHENE	1500	900	900	18 U	17.9 U	18 U	92.4	3.56 U	15.8 J	71.2 J	28.8 J	50 .	2480

# APPENDIX E-1 ANALYTICAL RESULTS - SURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 of 8

SAMPLE ID	1			DSY-SB204-	DSY-SB204-	DSY-SB204-	DSY-SB205-	DSY-SB206-	DSY-SB207-	DSY-SO-	DSY-SO-	DSY-SO-SB208	DSY-SO-
OAINI LE ID				SO-0002	SO-0002-D	SO-0002-AVG		SO-0002	SO-0002	SB208-000.5	SB208-000.5-D		SB209-0.30.7
TARGET AREA				HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP- 14 AREA			
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				0 FT	0 FT	0 FT	0.3 FT						
BOTTOM DEPTH				2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT					
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL
SUBMATRIX				SS	SS	SS	SS						
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG) Cont.													
CHRYSENE	15000	400	400	24.1 J	17.9 U	16.5 J	238	3.56 U	39.8	161 J	48.1 J	105 J	5650
DIBENZO(A,H)ANTHRACENE	15	400	15	18 U	17.9 U	18 U	124	3.56 U	17.2 U	24.7	10.1 J	17.4 J	
FLUORANTHENE	230000	20000	20000	31 J	17.9 U	20 J	424	3.56 U	50.6	350 J	103 J	226 J	13400
FLUORENE	230000	28000	28000	18 U	17.9 U	18 U	21.7 J	3.56 U	17.2 U	29.5	6.3 J	17.9 J	1220
INDENO(1,2,3-CD)PYRENE	150	900	150	15.1 J	17.9 U	12 J	99.1	3.56 U	24.6 J	55.1 J	23.5 J	39.3 J	2070
NAPHTHALENE	3600	54000	3600	18 U	17.9 U	18 U	18.9 U	3.56 U	18.4 J	24.5 J	14.7 J	19.6 J	751
PHENANTHRENE	170000	40000	40000	13.6 J	17.9 U	11.3 J	235	3.56 U	34.5	280 J	77.9 J	179 J	9530
PYRENE	170000	13000	13000	31.2 J	17.9 U	20.1 J	371	3.05 J	46.1	264 J	79.1 J	172 J	10100
PCBS (UG/KG)													
AROCLOR-1016	390		390	NA	NA	NA	NA	NA	. NA	19.1 UJ	20 UJ	19.6 UJ	18.9 UJ
AROCLOR-1221	140		140	NA	. NA	NA	NA	NA	. NA	19.1 U	20 U	19.6 U	18.9 U
AROCLOR-1232	140		140	NA	NA	NA	NA	NA	. NA	19.1 U	20 U	19.6 U	18.9 U
AROCLOR-1242	220		220	NA	NA	NA	NA	NA	NA	19.1 U	20 U	19.6 U	18.9 U
AROCLOR-1248	220		220	NA	NA	NA	NA	NA	. NA	19.1 U	20 U	19.6 U	18.9 U
AROCLOR-1254	220		220	NA	NA	NA	NA	NA	. NA	19.1 U	20 U	19.6 U	18.9 U
AROCLOR-1260	220		220	NA	. NA	NA	NA	NA	. NA	24.7 J	24.2 J	24.4 J	416 J
TOTAL AROCLOR	220	10000	220	NA	. NA	. NA	NA	NA	. NA	24.7 J	24.2 J	24.4 J	416 J
METALS (MG/KG)													
ALUMINUM	7700		7700	5740	5380	5560	9650	5850	6720	10900	10900	10900	9120
ANTIMONY	3.1	10	3.1	0.441 UJ	0.444 UJ	0.442 UJ	0.915 UJ	0.437 UJ	0.833 UJ	2.41 UJ	0.486 UJ	1.45 UJ	0.467 UJ
ARSENIC	0.39	7	0.39	3.35	3.57	3.46	9.81	2.41	6.16	21.8 J	21.6 J	21.7 J	10.4 J
BARIUM	1500	5500	1500	6.46	6.2	6.33	33.2	11.6	18.2	26.1 J	35.4 J	30.8 J	22.6 J
BERYLLIUM	16	0.4	0.4	0.243 J	0.234 J	0.238 J	0.658	0.38	0.462 J	0.57 J	0.576	0.573 J	0.463
CADMIUM	7	39	7	0.11 U	0.111 U	0.11 U	0.229 UJ	0.109 U	0.208 U	0.603 U	0.122 U	0.362 U	0.232 J
CALCIUM				1710	650	1180	2290	695	715	416 J	611 J	514 J	1110 J
CHROMIUM	0.29	390	0.29	9.16	8.14	8.65	16.1	9.79	9.58	14.6	13.9	14.2	12.8
COBALT	2.3		2.3	4.55	4.05	4.3	9.56	3.94	6.42	14.6 J	13.9 J	14.2 J	8.62 J
COPPER	310	3100	310	8.07 J	7.7 J	7.88 J	39.1 J	6.65 J	21.6 J	23.4 J	24.8 J	24.1 J	33.5 J
IRON	5500		5500	16100	14700	15400	27100	13900	19600	32000	28800	30400	22500
LEAD	400	150	150	4.18 J	3.95 J	4.06 J	50.6 J	3.38 J	24.9 J	18.4 J	16.4 J	17.4 J	26.5 J

# APPENDIX E-1 ANALYTICAL RESULTS - SURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 of 8

SAMPLE ID				DSY-SB204-	DSY-SB204-	DSY-SB204-	DSY-SB205-	DSY-SB206-	DSY-SB207-	DSY-SO-	DSY-SO-	DSY-SO-SB208	DSY-SO-
				SO-0002	SO-0002-D	SO-0002-AVG	SO-0002	SO-0002	SO-0002	SB208-000.5	SB208-000.5-D	000.5-AVG	SB209-0.30.7
TARGET AREA				HUTS 1	HUTS 1	HUTS 1 AND		HUTS 1		BLDG. 6 - TP-		BLDG. 6 - TP-	BLDG. 6 - TP-
				AND 2	AND 2	2	AND 2	AND 2	AND 2	14 AREA	14 AREA	14 AREA	14 AREA
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.3 FT
BOTTOM DEPTH				2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL
SUBMATRIX				SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM
METALS (MG/KG) Cont.	` ,					•							•
MAGNESIUM				2120	1940	2030	2680	2300	2100	2840	2910	2880	2910
MANGANESE	180	390	180	148 J	135 J	142 J	337 J	155 J	149 J	435	348	392	293
MERCURY	0.56	23	0.56	0.0292 U	0.0379 U	0.0336 U	0.037	0.038 U	0.0204 J	0.0247 J	0.0359 U	0.0213 J	0.0168 J
NICKEL	150	1000	150	12.2	11.5	11.8	21.4	12	15.8	25.5	26.3	25.9	21.1
POTASSIUM				271 J	287 J	279 J	614 J	639 J	318 J	904 U	304 J	378 J	394 J
SELENIUM	39	390	39	0.276 UJ	0.277 UJ	0.276 UJ	0.572 UJ	0.273 UJ	0.52 UJ	1.51 U	0.631	0.693	0.301 J
SILVER	39	200	39	0.11 U	0.111 U	0.11 U	0.229 U	0.109 U	0.208 U	0.603 U	0.122 U	0.362 U	0.583 U
SODIUM				166 U	166 U	166 U	343 U	164 U	312 U	904 U	182 U	543 U	71.4 J
THALLIUM		5.5	5.5	0.276 U	0.333 U	0.304 U	0.457 U	0.273 U	0.416 U	1.21 U	1.22 U	1.22 U	1.17 U
VANADIUM	39	550	39	10.3	8.84	9.57	21.1	9.48	12.3	25.1	18.6	21.8	14.2
ZINC	2300	6000	2300	28.1 J	25.3 J	26.7 J	77 J	26.2 J	51.5 J	75.5 J	86.4 J	81 J	137 J
PETROLEUM HYDROCARBONS (MG/KG)				-									
DIESEL RANGE ORGANICS		500	500	7.08 U	12.8	8.17	29.8	7.11 U	31.6	44.8	35.5	40.2	366
GASOLINE RANGE ORGANICS	1	500	500	5.87 U	4.28 U	5.08 U	4.48 U	5.52 U	4.06 U	2.83 J	4.82 J	3.82 J	3.74 U

# APPENDIX E-1 ANALYTICAL RESULTS - SURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 5 of 8

SAMPLE ID				DSY-SO-SB215-000.5	DSY-SO-SB216-000.5	DSY-SO-SB217-000.5	DSY-SO-SB224-000.5	DSY-SO-SB224-000.5-D	DSY-SO-SB224-000.5- AVG
TARGET AREA					BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)				
LOCATION ID				DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH				0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	FD	NM
VOLATILES (UG/KG)									
1,1,1-TRICHLOROETHANE	870000	540000	540000	NA	NA	NA	NA	NA	
1,1,2,2-TETRACHLOROETHANE	560	1300	560	NA	NA	NA	NA	NA	NA NA
1,1,2-TRICHLOROETHANE	1100	3600	1100	NA	NA	NA	NA	NA	NA NA
1,1-DICHLOROETHANE	3300	920000	3300	NA	NA	NA	NA	NA	NA NA
1,1-DICHLOROETHENE	24000	200	200	NA	NA	NA	NA	NA	NA NA
1,2,4-TRICHLOROBENZENE	22000	96000	22000	NA	NA	NA	NA	NA	N/
1,2-DIBROMO-3-CHLOROPROPANE	5.4	500	5.4	NA	NA	NA	NA	NA	NA NA
1,2-DIBROMOETHANE	34	10	10	NA	NA	NA	NA	NA	NA NA
1,2-DICHLOROBENZENE	190000	510000	190000	NA	NA	NA	NA	NA	NA NA
1,2-DICHLOROETHANE	430	900	430	NA	NA	NA	NA	NA	NA NA
1,2-DICHLOROPROPANE	890	1900	890	NA	NA	NA	NA	NA	NA NA
1,3-DICHLOROBENZENE		430000	430000	NA	NA	NA	NA	NA	NA NA
1,4-DICHLOROBENZENE	2400	27000	2400	NA	NA	NA	NA	NA	NA NA
2-BUTANONE	2800000	10000000	2800000	NA	NA	NA	NA	NA	NA NA
2-HEXANONE	21000		21000	NA	NA	NA	NA	NA	NA NA
4-METHYL-2-PENTANONE	530000	1200000	530000	NA	NA	NA	NA	NA	
ACETONE	6100000	7800000	6100000	NA	NA	NA	NA	NA	NA NA
BENZENE	1100	2500	1100	NA	NA	NA	NA	NA	N/A
BROMODICHLOROMETHANE	270	10000	270	NA	NA	NA	NA	NA	
BROMOFORM	61000	81000	61000	NA	NA	NA	NA	NA	
BROMOMETHANE	730	800	730	NA	NA	NA	NA	NA	
CARBON DISULFIDE	82000		82000	NA	NA	NA	NA	NA	N/A
CARBON TETRACHLORIDE	610	1500	610	NA	NA	NA	NA	NA	N/A
CHLOROBENZENE	29000	210000	29000	NA	NA	NA	NA	NA	NA NA
CHLORODIBROMOMETHANE	680	7600	680	NA	NA	NA	NA	NA	N/A
CHLOROETHANE	1500000		1500000	NA	NA	NA	NA	NA	N/A
CHLOROFORM	290	1200	290	NA	NA	NA	NA	NA	
CHLOROMETHANE	12000		12000	NA	NA	NA	NA	NA	N.A
CIS-1,2-DICHLOROETHENE	16000	630000	16000	NA	NA	NA	NA	NA	N.A.
CIS-1,3-DICHLOROPROPENE	1700		1700	NA	NA	NA	NA	NA	N/

# APPENDIX E-1 ANALYTICAL RESULTS - SURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 6 of 8

SAMPLE ID				DSY-SO-SB215-000.5	DSY-SO-SB216-000.5	DSY-SO-SB217-000.5	DSY-SO-SB224-000.5	DSY-SO-SB224-000.5-D	DSY-SO-SB224-000.5- AVG
TARGET AREA				BLDG. 6 - TP-14 AREA					
				(TRANSFORMER BANK)					
LOCATION ID				DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT					
BOTTOM DEPTH				0.5 FT					
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	FD	NM
VOLATILES (UG/KG) Cont.									
CYCLOHEXANE	700000		700000	NA	NA	NA	. NA	NA	NA
DICHLORODIFLUOROMETHANE	18000		18000	NA	NA	NA	. NA	NA	NA
ETHYLBENZENE	5400	71000	5400	NA	NA	NA	NA	NA	NA
ISOPROPYLBENZENE	210000	27000	27000	NA	NA	NA	NA	NA	NA
M+P-XYLENES				NA	NA	NA	NA	NA	NA
METHYL ACETATE	7800000		7800000	NA	NA	NA	NA	NA	NA
METHYL CYCLOHEXANE				NA	NA	NA	NA	NA	NA
METHYL TERT-BUTYL ETHER	43000	390000	43000	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	11000	45000	11000	NA	NA	NA	NA	NA	NA
O-XYLENE	380000		380000	NA	NA	NA	NA	NA	NA
STYRENE	630000	13000	13000	NA	NA	NA	NA	NA	NA
TETRACHLOROETHENE	550	12000	550	NA	NA	NA	NA	NA	NA
TOLUENE	500000	190000	190000	NA	NA	NA	NA	NA	NA
TOTAL 1,2-DICHLOROETHENE	70000	630000	70000	NA	NA	NA	NA	NA	NA
TOTAL XYLENES	63000	110000	63000	NA	NA	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	15000		15000	NA	NA	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	1700		1700	NA	NA	NA	. NA	NA	NA
TRICHLOROETHENE	2800	13000	2800	NA	NA	NA	NA	NA	NA
TRICHLOROFLUOROMETHANE	79000		79000	NA	NA	NA	NA	NA	NA
VINYL CHLORIDE	60	20	20	NA	NA	NA	. NA	NA	NA
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG)									
2-METHYLNAPHTHALENE	31000	123000	31000	NA	NA	NA	. NA	NA	NA
ACENAPHTHENE	340000	43000	43000	NA	NA	NA	NA	NA	NA
ACENAPHTHYLENE	340000	23000	23000	NA	NA	NA	NA	NA	NA
ANTHRACENE	1700000	35000	35000	NA	NA	NA	. NA	NA	NA
BENZO(A)ANTHRACENE	150	900	150	NA	NA	NA	. NA	NA	NA
BENZO(A)PYRENE	15	400	15	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	150	900	150	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	170000	800	800	NA	NA	NA	. NA	NA	NA
BENZO(K)FLUORANTHENE	1500	900	900	NA	NA	NA	NA	NA	NA

# APPENDIX E-1 ANALYTICAL RESULTS - SURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 7 of 8

SAMPLE ID				DSY-SO-SB215-000.5	DSY-SO-SB216-000.5	DSY-SO-SB217-000.5	DSY-SO-SB224-000.5	DSY-SO-SB224-000.5-D	DSY-SO-SB224-000.5-
o, == 15									AVG
TARGET AREA				BLDG. 6 - TP-14 AREA					
TARGET AREA					(TRANSFORMER BANK)				
LOCATION ID				DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT					
BOTTOM DEPTH				0.5 FT					
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	FD	NM
POLYCYCLIC AROMATIC									
HYDROCARBONS (UG/KG) Cont.									
CHRYSENE	15000	400	400	NA	NA		. NA		
DIBENZO(A,H)ANTHRACENE	15	400	15	NA	NA	NA	. NA		
FLUORANTHENE	230000	20000	20000	NA	NA	NA	. NA		
FLUORENE	230000	28000	28000	NA	NA	NA	. NA		
INDENO(1,2,3-CD)PYRENE	150	900	150	NA	NA	NA	. NA	. NA	. NA
NAPHTHALENE	3600	54000	3600	NA	NA	NA	. NA	NA NA	. NA
PHENANTHRENE	170000	40000	40000	NA	NA	NA	. NA	. NA	
PYRENE	170000	13000	13000	NA	NA	NA	. NA	. NA	. NA
PCBS (UG/KG)									
AROCLOR-1016	390		390	18.1 UJ	17.7 UJ	17.8 UJ	17.8 UJ	17.2 UJ	17.5 UJ
AROCLOR-1221	140		140	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
AROCLOR-1232	140		140	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
AROCLOR-1242	220		220	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
AROCLOR-1248	220		220	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
AROCLOR-1254	220		220	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
AROCLOR-1260	220		220	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
TOTAL AROCLOR	220	10000	220	18.1 UJ	17.7 UJ	17.8 UJ	17.8 UJ	17.2 UJ	17.5 UJ
METALS (MG/KG)									
ALUMINUM	7700		7700	NA	NA	NA	NA	NA NA	NA NA
ANTIMONY	3.1	10	3.1	NA	NA	NA	NA	NA NA	NA NA
ARSENIC	0.39	7	0.39	NA	NA	NA	NA	NA	NA NA
BARIUM	1500	5500	1500	NA	NA	NA	NA	NA NA	NA NA
BERYLLIUM	16	0.4	0.4	NA	NA	NA	NA	NA NA	NA NA
CADMIUM	7	39	7	NA	NA	NA	NA	NA NA	NA NA
CALCIUM	1			NA	NA	NA	NA	NA NA	NA NA
CHROMIUM	0.29	390	0.29	NA	NA	NA	NA	NA NA	NA NA
COBALT	2.3		2.3	NA	NA	NA	. NA		
COPPER	310	3100	310	NA	NA	NA	. NA	NA NA	
IRON	5500		5500	NA	NA	NA	. NA		. NA
LEAD	400	150		NA	NA	NA	NA	NA NA	

# APPENDIX E-1 ANALYTICAL RESULTS - SURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 8 of 8

SAMPLE ID				DSY-SO-SB215-000.5	DSY-SO-SB216-000.5	DSY-SO-SB217-000.5	DSY-SO-SB224-000.5	DSY-SO-SB224-000.5-D	DSY-SO-SB224-000.5- AVG
TARGET AREA					BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)				
LOCATION ID				DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH				0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	FD	NM
METALS (MG/KG) Cont.					•				
MAGNESIUM				NA	NA	. NA	. NA	. NA	. NA
MANGANESE	180	390	180	NA	NA	NA	NA NA	NA NA	. NA
MERCURY	0.56	23	0.56	NA	NA	. NA	NA NA	. NA	. NA
NICKEL	150	1000	150	NA	NA	NA	NA NA	NA NA	. NA
POTASSIUM				NA	NA	NA	NA NA	NA NA	. NA
SELENIUM	39	390	39	NA	NA	. NA	NA NA	NA NA	. NA
SILVER	39	200	39	NA	NA	NA	NA NA	NA NA	. NA
SODIUM				NA	NA	NA	NA NA	NA NA	. NA
THALLIUM		5.5	5.5	NA	NA	NA	NA NA	NA NA	. NA
VANADIUM	39	550	39	NA	NA	. NA	NA NA	NA NA	. NA
ZINC	2300	6000	2300	NA	NA	. NA	NA NA	NA NA	. NA
PETROLEUM HYDROCARBONS (MG/KG)									
DIESEL RANGE ORGANICS		500	500	NA	NA	NA	NA NA	NA NA	
GASOLINE RANGE ORGANICS		500	500	NA	NA	NA	NA NA	NA NA	. NA

E-2 SUBSURFACE SOIL SAMPLE ANALYTICAL DATA

## ANALYTICAL RESULTS - SUBSURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 of 4

SAMPLE ID	ı			DSY-SB201-SO-	DSY-SB202-SO-	DSY-SB204-	DSY-SB205-	DSY-SB206-	DSY-SB207-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-
SAMPLE ID				0204	0204	SO-0810	SO-088.5	SO-0810	SO-1012	SB210-0102	SB211-0102	SB212-0204	SB213-0203	SB214-0203
TARGET AREA				SOUTHERN	SOUTHERN	HUTS 1	HUTS 1	HUTS 1	HUTS 1	BLDG. 6 - TP-				
				WATERFRONT	WATERFRONT	AND 2	AND 2	AND 2	AND 2	14 AREA				
LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
SACODE				NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX				SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)														
1,1,1-TRICHLOROETHANE	870000	540000	540000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
1,1,2,2-TETRACHLOROETHANE	560	1300	560	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
1,1,2-TRICHLOROETHANE	1100	3600	1100	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
1,1-DICHLOROETHANE	3300	920000	3300	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
1,1-DICHLOROETHENE	24000	200	200	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
1,2,4-TRICHLOROBENZENE	22000	96000	22000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
1,2-DIBROMO-3-CHLOROPROPANE	5.4	500	5.4	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	. NA	NA NA	. NA	NA
1,2-DIBROMOETHANE	34	10	10	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
1,2-DICHLOROBENZENE	190000	510000	190000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
1,2-DICHLOROETHANE	430	900	430	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
1,2-DICHLOROPROPANE	890	1900	890	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
1,3-DICHLOROBENZENE		430000	430000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
1,4-DICHLOROBENZENE	2400	27000	2400	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
2-BUTANONE	2800000	10000000	2800000	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	. NA	NA NA	. NA	NA
2-HEXANONE	21000		21000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
4-METHYL-2-PENTANONE	530000	1200000	530000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
ACETONE	6100000	7800000	6100000	NA	NA	10.6 UJ	8.73 UJ	10.1 UJ	8.63 UJ	NA	. NA	NA NA	. NA	NA
BENZENE	1100	2500	1100	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
BROMODICHLOROMETHANE	270	10000	270	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
BROMOFORM	61000	81000	61000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
BROMOMETHANE	730	800	730	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	. NA	NA NA	. NA	NA
CARBON DISULFIDE	82000		82000	NA	NA	2.65 U	2.6 J	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
CARBON TETRACHLORIDE	610	1500	610	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA NA	NA NA	. NA	NA
CHLOROBENZENE	29000	210000	29000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
CHLORODIBROMOMETHANE	680	7600	680	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA
CHLOROETHANE	1500000		1500000	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	N/	NA NA	. NA	NA
CHLOROFORM	290	1200	290	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA NA	NA NA	. NA	NA
CHLOROMETHANE	12000		12000	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	. NA	NA NA	. NA	NA
CIS-1,2-DICHLOROETHENE	16000	630000	16000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	. NA	NA NA	. NA	NA

## ANALYTICAL RESULTS - SUBSURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 of 4

CAMPATER	CAMPLE ID		1		DOV CDOM CO	DOV CDOOS CO	DCV CD204	DCV CD20E	DCV CD20C	DCV CD207	DCV CO				
SOUTHERN   SOUTHERN   MUTS	SAMPLE ID						DSY-SB204-	DSY-SB205-	DSY-SB206-	DSY-SB207-	DSY-SO- SB210-0102	DSY-SO- SB211-0102	DSY-SO- SB212-0204	DSY-SO- SB213-0203	DSY-SO- SB214-0203
WATERFRONT   WATERFRONT   WATERFRONT   WAD 2   AND 2					0204	0204	00-0010	00-000.5	00-0010	00-1012	OB210-0102	OB211-0102	OB212-0204	OB213-0203	GB214-0203
Description	TARGET AREA	1			SOUTHERN	SOUTHERN	HUTS 1	HUTS 1	HUTS 1	HUTS 1	BLDG. 6 - TP-				
AMPLE DATE    0211/11   0209111   02					WATERFRONT	WATERFRONT	AND 2	AND 2	AND 2	AND 2	14 AREA				
AMPLE DATE    0211/11   0209111   02															
Description	LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
AFT	SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
MORNAL   M	TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
SUBMATRIX   PARKLSORE   RISORES	BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
DETTPE   EPARSLONE RISORES   MIN_SO   MM	SACODE				NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
VOLATILES   UGANG) Cont.	SUBMATRIX				SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
VICLATILES   (VICKOF) CONT.	QC TYPE	EPARSLSORE	RISORES	MIN_SO	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
1700   1700   1700   1700   1700   1700   1700   1700   1700   1700   1700   1700   1700   1700   1700   1700   1700   17000   170000   170000   170000   170000   18000   1		_NCx0_1													
EYCLOFEXAME 700000 700000 NA NA NA 2.66 U 2.18 U 2.51 U 2.16 U NA	VOLATILES (UG/KG) Cont.														
DICHLOROMETHANE   1800	CIS-1,3-DICHLOROPROPENE														l l
ETHYLERIZENE 5400 71000 5400 NA NA 2.66 U 2.18 U 2.51 U 2.16 U NA	CYCLOHEXANE	700000		700000	NA	NA	2.65 U		2.51 U	2.16 U	NA				
SOPROPYLBENZENE   210000   27000   27000   NA   NA   2.65 U   2.18 U   2.51 U   2.16 U   NA   NA   NA   NA   NA   NA   NA	DICHLORODIFLUOROMETHANE	18000		18000	NA	NA	5.3 UJ	4.36 UJ	5.03 UJ	4.32 UJ	NA	NA	NA	NA NA	l l
MP-XYLENES		5400	71000				2.65 U	2.18 U		2.16 U				NA NA	
METHYL ACETATE 7800000 7800000 NA NA NA 5.3 U 4.36 U 5.03 U 4.32 U NA		210000	27000	27000											
METHYL CYCLOHEXANE  43000  43000  43000  43000  ANA  ANA  2.65 U  2.18 U  2.51 U  2.16 U  ANA  ANA  ANA  ANA  ANA  ANA  ANA  A	M+P-XYLENES				NA		2.8 J	4.36 U	5.03 U	4.32 U	NA		NA	NA NA	l l
METHYLENE CHLORIDE 11000 45000 11000 NA NA 2.65 U 2.18 U 2.51 U 2.16 U NA	METHYL ACETATE	7800000		7800000	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	NA	NA	NA NA	
METHYLENE CHLORIDE 11000 45000 11000 NA NA NA 21 U 5.23 U 7.87 UJ 6.67 UJ NA	METHYL CYCLOHEXANE				NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA NA	l l
D-XYLENE 380000	METHYL TERT-BUTYL ETHER	43000	390000	43000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA NA	. NA
STYRENE 63000 13000 13000 NA NA 2.65 U 2.18 U 2.51 U 2.16 U NA	METHYLENE CHLORIDE	11000	45000	11000	NA	NA	21 U	5.23 UJ	7.87 UJ	6.67 UJ	NA	NA	NA	NA NA	
TETRACHLOROETHENE 550 1200 550 NA NA 2.65 U 2.18 U 2.51 U 2.16 U NA	O-XYLENE	380000		380000	NA		2.65 U	2.18 U	2.51 U	2.16 U	NA		NA	NA NA	l l
TOLUENE 500000 190000 190000 NA NA 2.65 U 2.18 U 2.51 U 2.16 U NA	STYRENE														
TOTAL 1,2-DICHLOROETHENE 70000 630000 70000 NA NA NA 2.65 U 2.18 U 2.51 U 2.16 U NA	TETRACHLOROETHENE		12000				2.65 U	2.18 U							
TOTAL XYLENES 63000 110000 63000 NA NA NA 7.95 U 6.54 U 7.54 U 6.47 U NA	TOLUENE	500000	190000	190000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA		NA	NA NA	l l
TRANS-1,2-DICHLOROETHENE 15000 15000 NA NA NA 2.65 U 2.18 U 2.51 U 2.16 U NA	TOTAL 1,2-DICHLOROETHENE		630000	70000						2.16 U				NA NA	
TRANS-1,3-DICHLOROPROPENE 1700 1700 NA NA 2.65 U 2.18 U 2.51 U 2.16 U NA	TOTAL XYLENES	63000	110000	63000		NA	7.95 U	6.54 U	7.54 U	6.47 U	NA		NA	NA NA	l l
TRICHLOROETHENE 2800 13000 2800 NA NA NA 2.65 U 2.18 U 2.51 U 2.16 U NA	TRANS-1,2-DICHLOROETHENE	15000		15000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA		NA	NA NA	l l
TRICHLOROFLUOROMETHANE 79000 79000 NA NA NA 5.3 U 4.36 U 5.03 U 4.32 U NA	TRANS-1,3-DICHLOROPROPENE							2.18 U		2.16 U				NA NA	
VINYL CHLORIDE 60 20 20 NA NA 2.65 U 2.18 U 2.51 U 2.16 U NA	TRICHLOROETHENE		13000												l l
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG) 2-METHYLNAPHTHALENE 31000 123000 31000 3.66 U 3.61 U 3.42 U 3.48 U 3.53 U 3.63 U 3.83 U 8.89 J 3.38 J 3.9 U 281 ACENAPHTHENE 340000 43000 43000 43000 3.66 U 3.61 U 3.42 U 3.62 J 3.53 U 3.63 U 3.83 U 4.11 U 3.53 U 2.87 J 5.63 U ACENAPHTHYLENE 340000 23000 23000 3.66 U 3.61 U 3.42 U 3.53 J 3.53 U 3.63 U 5.21 J 3.5 J 14.2 3.9 U 47.2 ANTHRACENE 1700000 35000 35000 3.66 U 3.61 U 3.42 U 8 3.53 U 3.63 U 5.83 J 4.11 U 17.2 4.71 J 5.63 U BENZO(A)ANTHRACENE 150 900 150 3.66 UJ 3.61 UJ 3.42 UU 27 J 3.53 UJ 3.63 UJ 41.3 38.1 60.5 32.5 BENZO(A)PYRENE 15 400 15 3.66 U 3.61 U 3.42 U 23.3 3.53 U 3.63 U 26.3 29.9 38.3 18.9 172	TRICHLOROFLUOROMETHANE	79000			NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA		NA	NA NA	
HYDROCARBONS (UG/KG)  2-METHYLNAPHTHALENE 31000 123000 31000 3.66 U 3.61 U 3.42 U 3.48 U 3.53 U 3.63 U 3.83 U 8.89 J 3.38 J 3.9 U 281  ACENAPHTHENE 340000 43000 43000 3.66 U 3.61 U 3.42 U 3.62 J 3.53 U 3.63 U 3.83 U 4.11 U 3.53 U 2.87 J 5.63 U  ACENAPHTHYLENE 340000 23000 23000 3.66 U 3.61 U 3.42 U 3.53 J 3.53 U 3.63 U 5.21 J 3.5 J 14.2 3.9 U 47.2  ANTHRACENE 1700000 35000 35000 3.66 U 3.61 U 3.42 U 8 3.53 U 3.63 U 5.83 J 4.11 U 17.2 4.71 J 5.63 U  BENZO(A)ANTHRACENE 150 900 150 3.66 UJ 3.61 UJ 3.42 UU 27 J 3.53 UJ 3.63 UJ 41.3 38.1 60.5 32.5  BENZO(A)PYRENE 15 400 15 3.66 UJ 3.61 U 3.42 U 23.3 3.53 U 3.63 U 26.3 29.9 38.3 18.9 172	VINYL CHLORIDE	60	20	20	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA NA	. NA
2-METHYLNAPHTHALENE 31000 123000 31000 3.66 U 3.61 U 3.42 U 3.48 U 3.53 U 3.63 U 3.83 U 8.89 J 3.38 J 3.9 U 281  ACENAPHTHENE 340000 43000 43000 3.66 U 3.61 U 3.42 U 3.62 J 3.53 U 3.63 U 3.83 U 4.11 U 3.53 U 2.87 J 5.63 U  ACENAPHTHYLENE 340000 23000 23000 3.66 U 3.61 U 3.42 U 3.53 J 3.53 U 3.63 U 5.21 J 3.5 J 14.2 3.9 U 47.2  ANTHRACENE 1700000 35000 35000 3.66 U 3.61 U 3.42 U 8 3.53 U 3.63 U 5.83 J 4.11 U 17.2 4.71 J 5.63 U  BENZO(A)ANTHRACENE 150 900 150 3.66 UJ 3.61 UJ 3.42 UJ 27 J 3.53 UJ 3.63 UJ 41.3 38.1 60.5 32.5  BENZO(A)PYRENE 15 400 15 3.66 UJ 3.61 U 3.42 U 23.3 3.53 U 3.63 U 26.3 29.9 38.3 18.9 172	POLYCYCLIC AROMATIC														
ACENAPHTHENE 34000 43000 43000 3.66 U 3.61 U 3.42 U 3.62 J 3.53 U 3.63 U 3.63 U 4.11 U 3.53 U 2.87 J 5.63 U ACENAPHTHYLENE 34000 23000 23000 3.66 U 3.61 U 3.42 U 3.53 J 3.53 U 3.63 U 5.21 J 3.5 J 14.2 3.9 U 47.2 ANTHRACENE 170000 35000 35000 3.66 U 3.61 U 3.42 U 8 3.53 U 3.63 U 5.21 J 3.5 J 14.2 3.9 U 47.2 ANTHRACENE 150 900 150 3.66 UJ 3.61 UJ 3.42 U 8 3.53 U 3.63 U 5.83 J 4.11 U 17.2 4.71 J 5.63 U 3.62 U 3.63	, ,	1												1	
ACENAPHTHYLENE 340000 23000 23000 3.66 U 3.61 U 3.42 U 3.53 J 3.53 U 3.63 U 5.21 J 3.5 J 14.2 3.9 U 47.2 ANTHRACENE 170000 35000 35000 3.66 U 3.61 U 3.42 U 8 3.53 U 3.63 U 5.83 J 4.11 U 17.2 4.71 J 5.63 U BENZO(A)ANTHRACENE 150 900 150 3.66 UJ 3.61 UJ 3.42 UU 27 J 3.53 UJ 3.63 UJ 41.3 38.1 60.5 32.5 BENZO(A)PYRENE 15 400 15 3.66 UJ 3.61 U 3.42 U 23.3 3.53 UJ 3.63 U 26.3 29.9 38.3 18.9 172															
ANTHRACENE 1700000 35000 35000 3.66 U 3.61 U 3.42 U 8 3.53 U 3.63 U 5.83 J 4.11 U 17.2 4.71 J 5.63 U BENZO(A)ANTHRACENE 150 900 150 3.66 UJ 3.61 UJ 3.42 UJ 27 J 3.53 UJ 3.63 UJ 41.3 38.1 60.5 32.5 252 BENZO(A)PYRENE 15 400 15 3.66 U 3.61 U 3.42 U 23.3 3.53 U 3.63 U 26.3 29.9 38.3 18.9 172															
BENZO(A)ANTHRACENE 150 900 150 3.66 UJ 3.61 UJ 3.42 UJ 27 J 3.53 UJ 3.63 UJ 41.3 38.1 60.5 32.5 252 BENZO(A)PYRENE 15 400 15 3.66 U 3.61 U 3.42 U 23.3 3.53 U 3.63 U 26.3 29.9 38.3 18.9 172															
BENZO(A)PYRENE 15 400 15 3.66 U 3.61 U 3.42 U 23.3 3.53 U 3.63 U 26.3 29.9 38.3 18.9 172								Ŭ							
	· /							_							
BENZO(B)FLUORANTHENE   150 900 150 3.66 U 3.61 U 3.42 U 41.1 3.53 U 2.65 J 38.8 44.4 57.9 26.6 336	BENZO(A)PYRENE														
	BENZO(B)FLUORANTHENE	150	900	150	3.66 U	3.61 U	3.42 U	41.1	3.53 U	2.65 J	38.8	44.4	57.9	26.6	336

## ANALYTICAL RESULTS - SUBSURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 of 4

CAMPLE ID		1		DOV CDOM CO	DOV CDOOS CO	DCV CD204	DCV CD20E	DCV CD20C	DCV CD207	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-	DSY-SO-
SAMPLE ID				DSY-SB201-SO- 0204	DSY-SB202-SO- 0204	DSY-SB204- SO-0810	DSY-SB205- SO-088.5	DSY-SB206- SO-0810	DSY-SB207- SO-1012	SB210-0102	SB211-0102	SB212-0204	SB213-0203	SB214-0203
				0204	0204	00-0010	00-000.5	00-0010	00-1012	OB210-0102	OB211-0102	OB212-0204	OB213-0203	OB214-0203
TARGET AREA				SOUTHERN	SOUTHERN	HUTS 1	HUTS 1	HUTS 1	HUTS 1	BLDG. 6 - TP-				
				WATERFRONT	WATERFRONT	AND 2	AND 2	AND 2	AND 2	14 AREA				
								ļ						
LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
SACODE				NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX				SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
POLYCYCLIC AROMATIC		•	•			•		•					•	
HYDROCARBONS (UG/KG) Cont.														
BENZO(G,H,I)PERYLENE	170000	800	800		3.61 U	3.42 U	21.6		2.51 J	15.7	21	20		91.1
BENZO(K)FLUORANTHENE	1500	900	900	3.66 U	3.61 U	3.42 U	11.2	3.53 U	3.63 U	16.1	17.5	25.6	11.3 J	124
CHRYSENE	15000	400	400	3.66 U	3.61 U	3.42 U	32.1	3.53 U	3.63 U	28.6	30.4	44.7	20.5	356
DIBENZO(A,H)ANTHRACENE	15	400	15	3.66 U	3.61 U	3.42 U	23.3	3.53 U	3.63 U	3.83 U	7.48 J	7.89 J	3.9 U	43.7
FLUORANTHENE	230000	20000	20000	3.66 U	3.61 U	3.42 U	55.3			61.2	39.6	128	43.2	451
FLUORENE	230000	28000	28000	3.66 U	3.61 U	3.42 U	2.93 J	3.53 U	3.63 U	2.22 J	4.11 U	8.85 J	2.67 J	5.63 U
INDENO(1,2,3-CD)PYRENE	150	900	150	3.66 U	3.61 U	3.42 U	18	3.53 U	3.63 U	12.3 J	18.5	17.4	10.2 J	82.7
NAPHTHALENE	3600	54000	3600	3.66 U	3.61 U	3.42 U	3.54 J	3.53 U	3.63 U	2.5 J	9.04 J	5.06 J	3.9 U	175
PHENANTHRENE	170000	40000	40000	3.66 U	3.61 U	3.42 U	30.8		2.1 J	24.8	25.2	91.3	25.8	400
PYRENE	170000	13000	13000	3.66 U	3.61 U	3.42 U	47.4	3.53 U	2.05 J	50.1	35.8	94.2	33.9	375
PCBS (UG/KG)														
AROCLOR-1016	390		390	NA	NA	. NA	NA	NA NA	. NA	18.6 UJ	20.7 UJ	17.2 UJ	18.9 U	26.9 UJ
AROCLOR-1221	140		140	NA	NA	. NA	NA	NA NA	. NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
AROCLOR-1232	140		140	NA	NA	. NA	NA	NA NA	. NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
AROCLOR-1242	220		220	NA	NA	. NA	NA	NA NA	. NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
AROCLOR-1248	220		220		NA	. NA	NA	NA NA	. NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
AROCLOR-1254	220		220	NA	NA	. NA	NA	NA NA	. NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
AROCLOR-1260	220		220	NA	NA	. NA	NA	NA NA	. NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
TOTAL AROCLOR	220	10000	220	NA	NA	. NA	NA	NA NA	NA	18.6 UJ	20.7 UJ	17.2 UJ	18.9 U	26.9 UJ
METALS (MG/KG)														
ALUMINUM	7700		7700	17400	15900	3290	5790	3190	6100	12600	11700	2180	12500	9150
ANTIMONY	3.1	10	3.1	0.912 UJ	0.858 UJ	0.425 UJ	0.84 UJ	0.43 UJ	0.88 UJ	2.38 UJ	0.476 UJ	0.428 UJ	2.27 UJ	1.15 J
ARSENIC	0.39	7	0.39	15.9	26.3	3.62	7.42	4.44	9.79	13 J	13.5 J	1.47 J	11.8 J	47.2 J
BARIUM	1500	5500	1500	14.6	14.8	4.5	8.85	4.43	5.11	24.2 J	31 J	20.4 J	16.4 J	57.7 J
BERYLLIUM	16	0.4	0.4	0.418 J	0.392 J	0.176 J	0.314 J	0.204 J	0.34 J	0.511 J	0.607	0.697	0.507 J	0.759
CADMIUM	7	39	7	0.228 U	0.214 U	0.106 U	0.21 U	0.108 U	0.22 U	0.595 U	0.119 U	0.107 U	0.567 U	0.0903 J
CALCIUM				1770	1000	443	1020	429	496 J	620 J	279 J	501 J	631 J	2040 J
CHROMIUM	0.29	390	0.29	21.2	18.2	4.98	9.49	5.27	8.77	15.4	12	0.788	18.5	11.6
COBALT	2.3		2.3	17.9	21.1	5.15	4.54	3.68	5.85	11.1 J	8.75 J	1.29 J	12.4 J	17 J

## ANALYTICAL RESULTS - SUBSURFACE SOIL SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 of 4

SAMPLE ID				DSY-SB201-SO- 0204	DSY-SB202-SO- 0204	DSY-SB204- SO-0810	DSY-SB205- SO-088.5	DSY-SB206- SO-0810	DSY-SB207- SO-1012	DSY-SO- SB210-0102	DSY-SO- SB211-0102	DSY-SO- SB212-0204	DSY-SO- SB213-0203	DSY-SO- SB214-0203
TARGET AREA				SOUTHERN WATERFRONT	SOUTHERN WATERFRONT	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP- 14 AREA				
LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
SACODE				NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX				SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
METALS (MG/KG) Cont.														
COPPER	310	3100	310	29.9 J	28.2 J	4.42 J	12.5 J	5.25 J	11.7 J	20 J	13.7 J	1.67 J	19.1 J	39.5 J
IRON	5500		5500	44400	45500	9830	18300	12200	20900	35900	23600	6800	30900	22100
LEAD	400	150	150	9.49 J	13.6 J	1.96 J	13.8 J	2.81 J	8.23 J	12 J	16.1 J	2.49 J	17 J	81.4 J
MAGNESIUM				5220	4850	1110	1830	1110	1850	3610	2280	646	4010	2030
MANGANESE	180	390	180	488 J	681 J	169 J	145 J	95.7 J	171 J	428	358	305	346	1190
MERCURY	0.56	23	0.56	0.0351 U	0.0312 U	0.0331 U	0.0125 J	0.03 U	0.031 U	0.0138 J	0.0323 J	0.0276 U	0.0343 U	0.0603
NICKEL	150	1000	150	38.6	37.9	9.68	12.5	8.8	15	22.7	17	0.596	25.9	22
POTASSIUM				243 J	257 J	219 J	248 J	188 J	161 J	242 J	226 J	681 J	346 J	264 J
SELENIUM	39	390	39	0.57 UJ	0.536 U	0.16 J	0.525 UJ	0.269 UJ	0.55 UJ	1.49 U	0.67	0.268 U	1.42 U	1.31
SILVER	39	200	39	0.228 U	0.214 U	0.106 U	0.21 U	0.108 U	0.22 U	0.595 U	0.119 U	0.535 U	0.567 U	0.859 U
SODIUM				342 U	322 U	160 U	315 U	161 U	330 U	179 U	178 U	161 U	170 U	90.6 J
THALLIUM		5.5	5.5	0.57 U	0.536 U	0.213 U	0.42 U	0.215 U	0.44 U	1.19 U	1.19 U	1.07 U	1.13 U	1.72 U
VANADIUM	39	550	39	18.6	17.7	5.82	11	6.12	12.4	19.8	17.7	3.97	20.6	19.3
ZINC	2300	6000	2300	72.8 J	75.7 J	17.9 J	36 J	21.9 J	41.1 J	65.9 J	53.6 J	27.1 J	64.7 J	335 J
PETROLEUM HYDROCARBONS (MG/KG)														
DIESEL RANGE ORGANICS		500	500	NA	NA	7.49	6.99 U	6.83 U	7.31 U	37.6	48.2	17.8	25	NA NA
GASOLINE RANGE ORGANICS		500	500	NA	NA	5.09 U	4.22 U	5.04 U	4.9 U	4.37 U	4.66 U	4.39 U	3.43 U	6.9 UJ



## ANALYTICAL RESULTS - GROUNDWATER SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 of 8

SAMPLE ID				DSY-GW- MW02A-022411	DSY-GW-MW03- 022411	DSY-GW- MW08-030111	DSY-GW- MW11A-022611		DSY-GW- MW11A-022611- AVG	DSY-GW-MW12- 030311	-DSY-GW- MW204- 031711
TARGET AREA				NORTHERN WATERFRONT	NORTHERN WATERFRONT	BLDG. 234 AREA	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	HUTS 1 AND 2
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM
VOLATILES (UG/L)											
1,1,1-TRICHLOROETHANE	200	200	200	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
1,1-DICHLOROETHANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	7	7	7	0.5 U	0.5 U	0.25 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	70	70	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	0.2	0.2	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMOETHANE	0.05	0.05	0.05	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2-DICHLOROBENZENE	600	600	600		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2-DICHLOROETHANE	5	5			0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	5				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,3-DICHLOROBENZENE		600					0.5 U	0.5 U	0.5 U		
1,4-DICHLOROBENZENE	75	75	75		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
2-BUTANONE				5 U		5 U	5 U	5 U	5 U	5 U	
2-HEXANONE				2.5 U			2.5 U	2.5 U	2.5 U		
4-METHYL-2-PENTANONE				2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	
ACETONE				5 UJ	5 UJ	5 U	5 U	5 U	5 U		
BENZENE	5	5			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
BROMODICHLOROMETHANE	80		80		0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U		
BROMOFORM BROMOMETHANE	80		80	0.5 U	0.5 U	0.5 U	0.5 U 1 U	0.5 U 1 U	0.5 U 1 U	0.5 U	
CARBON DISULFIDE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	_
CARBON TETRACHLORIDE	5	5	5		0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U		
CHLOROBENZENE	100	100		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
CHLORODIBROMOMETHANE	80	100	80		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
CHLOROETHANE	00		00	0.5 U			0.5 U	0.5 U	0.5 U		
CHLOROFORM	80		80		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
CHLOROMETHANE	- 00		- 00	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
CIS-1,2-DICHLOROETHENE	70	70	70		0.5 U	12.7	0.284 J	0.361 J	0.322 J	3.73	
CIS-1,3-DICHLOROPROPENE			<del>                                     </del>	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	
CYCLOHEXANE				0.5 U				0.5 U	0.5 U		

## ANALYTICAL RESULTS - GROUNDWATER SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 of 8

SAMPLE ID				DSY-GW- MW02A-022411	DSY-GW-MW03- 022411	DSY-GW- MW08-030111	DSY-GW- MW11A-022611	DSY-GW- MW11A-022611-	DSY-GW- MW11A-022611-	DSY-GW-MW12	DSY-GW- MW204-
				10100250 022-11	022411		10000177	D	AVG	000011	031711
TARGET AREA				NORTHERN WATERFRONT	NORTHERN WATERFRONT	BLDG. 234 AREA	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	HUTS 1 AND 2
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM
VOLATILES (UG/L) Cont.									l		
DICHLORODIFLUOROMETHANE				1 U	1 U	1 U	1 U	1 U	_	_	1 UJ
ETHYLBENZENE	700	700	700		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ISOPROPYLBENZENE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
M+P-XYLENES	10000		10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
METHYL ACETATE				1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
METHYL CYCLOHEXANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
METHYL TERT-BUTYL ETHER		40	40	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYLENE CHLORIDE	5	5	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
O-XYLENE	10000		10000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
STYRENE	100	100	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	5	5	5	0.5 U	0.696 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOLUENE	1000	1000	1000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOTAL 1,2-DICHLOROETHENE				0.291 J	0.5 U	12.7	0.953 J	1.04 J	0.996 J	8.54	
TOTAL XYLENES	10000	10000	10000	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
TRANS-1,2-DICHLOROETHENE	100	100	100	0.5 U	0.5 U	0.5 U	0.669 J	0.683 J	0.676 J	4.81	0.5 U
TRANS-1,3-DICHLOROPROPENE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	5	5	5	0.5 U	7.35	3.9	5.15	4.97	5.06	9.61	
TRICHLOROFLUOROMETHANE				1 UJ	1 UJ	0.581 J	1 U	1 U	1 U	1 U	1 U
VINYL CHLORIDE	2	2	2	0.5 U	0.5 U	0.263 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
POLYCYCLIC AROMATIC HYDROCARBONS (UG/L)											
2-METHYLNAPHTHALENE				NA	. NA	0.0926 U	NA	NA	NA	NA	0.0962 U
ACENAPHTHENE				NA	. NA	0.0926 U	NA	NA	NA	. NA	0.0962 U
ACENAPHTHYLENE				NA	. NA	0.0926 U	NA	NA	NA	NA	0.0962 U
ANTHRACENE				NA	. NA	0.0926 U	NA	NA	NA	NA	0.0962 U
BENZO(A)ANTHRACENE				NA	. NA	0.0926 U	NA	NA	NA	NA	0.0962 U
BENZO(A)PYRENE	0.2	0.2	0.2	NA	. NA	0.0926 U	NA	NA	NA	NA	0.0962 U
BENZO(B)FLUORANTHENE				NA	. NA	0.0926 U	NA	NA	NA	NA	0.0962 U
BENZO(G,H,I)PERYLENE				NA	. NA	0.0926 U	NA	NA	NA	NA	0.0962 U
BENZO(K)FLUORANTHENE	İ		1	NA	. NA	0.0926 U	NA	NA	NA	NA	0.0962 U
CHRYSENE				NA	. NA	0.0926 U	NA	NA	NA	NA	0.0962 U
DIBENZO(A,H)ANTHRACENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U

### ANALYTICAL RESULTS - GROUNDWATER SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 of 8

SAMPLE ID				DSY-GW- MW02A-022411	DSY-GW-MW03- 022411	DSY-GW- MW08-030111	DSY-GW- MW11A-022611	DSY-GW- MW11A-022611- D	DSY-GW- MW11A-022611- AVG	DSY-GW-MW12- 030311	DSY-GW- MW204- 031711
TARGET AREA				NORTHERN WATERFRONT	NORTHERN WATERFRONT	BLDG. 234 AREA	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	HUTS 1 AND 2
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM
POLYCYCLIC AROMATIC HYDROCARBONS (UG/L) Cont.			l								
FLUORANTHENE				NA	NA	0.0926 U		NA	NA	NA	
FLUORENE				NA	NA	0.0926 U		NA	NA	NA	
INDENO(1,2,3-CD)PYRENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
NAPHTHALENE		20	20		NA	0.0926 U	NA	NA	NA	NA	
PHENANTHRENE				NA	NA	0.0926 U		NA	NA	NA	0.0962 U
PYRENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
METALS (UG/L)											
ALUMINUM				NA	NA	53.7	NA	NA	NA	NA	337
ANTIMONY	6	6	6	NA	NA	2 U	NA	NA	NA	NA	2 U
ARSENIC	10		10	NA	NA	1.32 J	NA	NA	NA	NA	1.5 UJ
BARIUM	2000	2000	2000	NA	NA	17	NA	NA	NA	NA	11.6
BERYLLIUM	4	4	4	NA	NA	0.5 U	NA	NA	NA	NA	0.5 U
CADMIUM	5	5	5	NA	NA	0.286 J	NA	NA	NA	NA	0.5 U
CALCIUM				NA	NA	46800	NA	NA	NA	NA	29100 J
CHROMIUM	100	100	100	NA	NA	. 1 U	NA	NA	NA	NA	0.508 J
COBALT				NA	NA	1.74 J	NA	NA	NA	NA	2.5 U
COPPER	1300		1300	NA	NA	1.57 J	NA	NA	NA	NA	2 U
IRON				NA	NA	459	NA	NA	NA	NA	605 J
LEAD	15	15	15	NA	NA	0.75 U	NA	NA	NA	NA	0.75 U
MAGNESIUM				NA	NA	9790	NA	NA	NA	NA	7110 J
MANGANESE				NA	NA	532	. NA	NA	NA	NA	53.9
MERCURY	2	2	2	NA	NA	0.2 U	NA	NA	NA	NA	0.2 U
NICKEL		100	100	NA	NA	2.08 J	NA	NA	NA	NA	3.38
POTASSIUM				NA	NA	5120	NA	NA	NA	NA	1660
SELENIUM	50	50	50	NA	NA	1.25 U	NA	NA	NA	NA	1.25 U
SILVER				NA	NA	0.5 U	NA	NA	NA	NA	0.5 U
SODIUM				NA	NA	111000	NA	NA	NA	NA	40100
THALLIUM	2	2	2	NA	NA	1 U	NA	NA	NA	NA	1 U
VANADIUM				NA	NA	2.5 U	NA	NA	NA	NA	2.5 U
ZINC				NA	NA	29.8 J	NA	NA	NA	NA	6.65

## ANALYTICAL RESULTS - GROUNDWATER SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 of 8

SAMPLE ID					DSY-GW-MW03- 022411	DSY-GW- MW08-030111	DSY-GW- MW11A-022611	MW11A-022611-	DSY-GW- MW11A-022611- AVG	DSY-GW-MW12 ·030311	DSY-GW- MW204- 031711
TARGET AREA				NORTHERN WATERFRONT	NORTHERN WATERFRONT	BLDG. 234 AREA	NORTHERN WATERFRONT	-	NORTHERN WATERFRONT	NORTHERN WATERFRONT	HUTS 1 AND 2
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM
DISSOLVED METALS (UG/L)											
ALUMINUM				NA	NA	36.6 J	NA	NA	NA	. NA	72
ANTIMONY	6	6	6	NA	NA	2 U	NA	NA	NA	. NA	2 U
ARSENIC	10		10	NA	NA	1.37 J	NA	NA	NA	. NA	1.5 UJ
BARIUM	2000	2000	2000	NA	NA	16.1	NA	NA	NA	. NA	11.5
BERYLLIUM	4	4	4	NA	NA	0.5 U	NA	NA	NA	. NA	0.5 U
CADMIUM	5	5	5	NA	NA	0.274 J	NA	NA	NA	. NA	0.5 U
CALCIUM				NA	NA	47800	NA	NA	NA	. NA	30800 J
CHROMIUM	100	100	100	NA	NA	1 U	NA	NA	NA	. NA	1 U
COBALT				NA	NA	1.78 J	NA	NA	NA	. NA	2.5 U
COPPER	1300		1300	NA	NA	1.17 J	NA	NA	NA	. NA	1.19 J
IRON				NA	NA	423	NA	NA	NA	. NA	50.5 J
LEAD	15	15	15	NA	NA	0.75 U	NA	NA	NA	. NA	0.75 U
MAGNESIUM				NA	NA	9790	NA	NA	NA	. NA	7450 J
MANGANESE				NA	NA	531	NA	NA	NA	. NA	53.3
MERCURY	2	2	2	NA	NA	0.2 U	NA	NA	NA	. NA	0.2 U
NICKEL		100	100	NA	NA	1.75 J	NA	NA	NA	. NA	3.39
POTASSIUM				NA	NA	5010	NA	NA	NA	. NA	1770
SELENIUM	50	50	50	NA	NA	1.25 U	NA	NA	NA	. NA	1.25 U
SILVER				NA	NA	0.5 U	NA	NA	NA	. NA	0.5 U
SODIUM				NA	NA	114000	NA	NA	NA	. NA	42300
THALLIUM	2	2	2	NA	NA	1 U	NA	NA	NA	. NA	1 U
VANADIUM				NA	NA	2.5 U	NA	NA	NA	. NA	2.5 U
ZINC				NA	NA	16.6	NA	NA	NA	NA NA	6.48

## ANALYTICAL RESULTS - GROUNDWATER SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 5 of 8

SAMPLE ID				DSY-GW- MW218- 030111	DSY-GW- MW219- 031611	DSY-GW- MW219- 031611-D	DSY-GW- MW219- 031611-AVG	DSY-GW- MW220-030111	DSY-GW- MW221-030211	DSY-GW- MW222-030211	DSY-GW-MW223- 031611
TARGET AREA				BLDG. 42	BLDG. 42	BLDG. 42	BLDG 42	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRTONT (UPGRADIENT LOC.)
LOCATION ID				DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
SAMPLE DATE				03/01/11	03/16/11	03/16/11	03/16/11	03/01/11	03/02/11	03/02/11	03/16/11
SACODE				NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	FD	NM	NM	NM	NM	NM
VOLATILES (UG/L)											
1,1,1-TRICHLOROETHANE	200	200	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	7	7	7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	70	70	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
1,2-DIBROMO-3-CHLOROPROPANE	0.2	0.2	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMOETHANE	0.05	0.05	0.05	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROBENZENE	600	600	600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-DICHLOROBENZENE		600	600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-DICHLOROBENZENE	75	75	75	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-BUTANONE				5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-HEXANONE				2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
4-METHYL-2-PENTANONE				2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
ACETONE				5 U	5 U	3.28 J	2.89 J	5 U	5 U	5 U	5 U
BENZENE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMODICHLOROMETHANE	80		80	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U
BROMOFORM	80		80	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOMETHANE				1 U	1 U	1 U	1 U	_	1 U	1 U	1 U
CARBON DISULFIDE				0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U
CARBON TETRACHLORIDE	5				0.5 U						
CHLOROBENZENE	100				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLORODIBROMOMETHANE	80		80		0.5 U		0.5 U		0.5 U		0.5 U
CHLOROETHANE				1 U	1 UJ	1 UJ	1 UJ	_			1 UJ
CHLOROFORM	80		80		0.5 U		0.5 U		0.5 U		0.5 U
CHLOROMETHANE				0.5 U	0.5 U		0.5 U				0.5 U
CIS-1,2-DICHLOROETHENE	70	70	70		0.5 U	0.5 U	0.5 U		-	0.5 U	0.5 U
CIS-1,3-DICHLOROPROPENE				0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U
CYCLOHEXANE	<u> </u>			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

## ANALYTICAL RESULTS - GROUNDWATER SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 6 of 8

SAMPLE ID				DSY-GW- MW218- 030111	DSY-GW- MW219- 031611	DSY-GW- MW219- 031611-D	DSY-GW- MW219- 031611-AVG	DSY-GW- MW220-030111	DSY-GW- MW221-030211	DSY-GW- MW222-030211	DSY-GW-MW223- 031611
TARGET AREA				BLDG. 42	BLDG. 42	BLDG. 42	BLDG 42	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRTONT (UPGRADIENT LOC.)
LOCATION ID				DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
SAMPLE DATE				03/01/11	03/16/11	03/16/11	03/16/11	03/01/11	03/02/11	03/02/11	03/16/11
SACODE				NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	FD	NM	NM	NM	NM	NM
VOLATILES (UG/L) Cont.					<u></u>	<u></u>	<u> </u>				l
DICHLORODIFLUOROMETHANE				1 U	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 UJ
ETHYLBENZENE	700	700	700	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ISOPROPYLBENZENE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
M+P-XYLENES	10000		10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
METHYL ACETATE				1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
METHYL CYCLOHEXANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYL TERT-BUTYL ETHER		40	40	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYLENE CHLORIDE	5	5	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
O-XYLENE	10000		10000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
STYRENE	100	100	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOLUENE	1000	1000	1000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOTAL 1,2-DICHLOROETHENE				0.5 U	0.5 U	0.5 U	0.5 U	5.36	1.49	0.5 U	0.5 U
TOTAL XYLENES	10000	10000	10000	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
TRANS-1,2-DICHLOROETHENE	100	100	100	0.5 U	0.5 U	0.5 U	0.5 U	1.1	0.5 U	0.5 U	0.5 U
TRANS-1,3-DICHLOROPROPENE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12.2	5.48	0.5 U
TRICHLOROFLUOROMETHANE				1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
VINYL CHLORIDE	2	2	2	0.5 U	0.5 U	0.5 U	0.5 U	1.47	0.5 U	0.5 U	0.5 U
POLYCYCLIC AROMATIC HYDROCARBONS (UG/L)											
2-METHYLNAPHTHALENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	. NA	NA
ACENAPHTHENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
ACENAPHTHYLENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	. NA
ANTHRACENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
BENZO(A)ANTHRACENE				0.221 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	. NA
BENZO(A)PYRENE	0.2	0.2	0.2	0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	. NA
BENZO(B)FLUORANTHENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
BENZO(K)FLUORANTHENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
CHRYSENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	. NA
DIBENZO(A,H)ANTHRACENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	. NA	NA

## ANALYTICAL RESULTS - GROUNDWATER SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 7 of 8

OAMBI E ID	-	1	1	DSY-GW-	DSY-GW-	DSY-GW-	DSY-GW-	DSY-GW-	DSY-GW-	DSY-GW-	DSY-GW-MW223-
SAMPLE ID				MW218-	MW219-	MW219-	MW219-		MW221-030211		
				030111	031611	031611-D	031611-AVG	WW220-030111	10100221-030211	WW 222-030211	031011
TARGET AREA				BLDG. 42	BLDG. 42	BLDG. 42	BLDG 42	NORTHERN	NORTHERN	NORTHERN	NORTHERN
								WATERFRONT	WATERFRONT	WATERFRONT	WATERFRTONT
											(UPGRADIENT LOC.)
LOCATION ID				DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
OAMBI E DATE				00/04/44	00/40/44	00/40/44	00/40/44	00/04/44	00/00/44	00/00/44	00/40/44
SAMPLE DATE				03/01/11 NORMAL	03/16/11 ORIG	03/16/11 DUP	03/16/11	03/01/11 NORMAL	03/02/11	03/02/11	03/16/11 NORMAL
SACODE QC TYPE	FEDMO	DICAGR	MIN GW	_	NM	FD	AVG NM	NORMAL	NORMAL NM	NORMAL NM	NM
QC I YPE	FEDIVICE	RIGAUB	IVIIIN_GVV	INIVI	INIVI	FD	INIVI	INIVI	INIVI	INIVI	INIVI
POLYCYCLIC AROMATIC								l .	<u>I</u>		l
HYDROCARBONS (UG/L) Cont.				1							
FLUORANTHENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	. NA	NA
FLUORENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	. NA	NA
INDENO(1,2,3-CD)PYRENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	. NA	NA
NAPHTHALENE		20	20	0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	. NA	NA
PHENANTHRENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
PYRENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
METALS (UG/L)											
ALUMINUM				52.9	312	274	293	NA NA	NA	NA	NA
ANTIMONY	6	6	6	2 U	2 U	2 U	2 U	NA	NA	NA	NA
ARSENIC	10		10	27.8	74.5 J	78.1 J	76.3 J	NA	NA	NA	NA
BARIUM	2000	2000	2000	86.6	34	34.9	34.4	NA	NA	NA	NA
BERYLLIUM	4	4	4	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
CADMIUM	5	5	5	0.5 U	1.53	1.41	1.47	NA	NA	NA	NA
CALCIUM				79700	38400 J	40000 J	39200 J	NA	NA	NA	NA
CHROMIUM	100	100	100	5 U	1 U	1 U	1 U	NA	NA	NA	NA
COBALT				24.8	13.7	14.1	13.9	NA	NA	NA	NA
COPPER	1300		1300	2 U	2 U	2 U	2 U	NA	NA	NA	NA
IRON				11100	61900 J	65800 J	63800 J	NA	NA	NA	NA
LEAD	15	15	15	3.75 U	1.28	1.07	1.18	NA	NA	NA	NA
MAGNESIUM				16700	8090 J	8400 J	8240 J	NA	NA	. NA	NA
MANGANESE				9100	4510	4880	4700	NA	NA	NA	NA
MERCURY	2	2	2	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA
NICKEL		100	100	4.64	1.5 U	1.5 U	1.5 U	NA	NA	NA	NA
POTASSIUM				11000	5970	6200	6080	NA	NA	. NA	NA
SELENIUM	50	50	50	6.25 U	1.55 J	1.24 J	1.4 J	NA	NA	NA	NA
SILVER				2.5 U	0.5 U	0.5 U	0.5 U	NA	NA	. NA	NA
SODIUM				62700	34400	35400	34900	NA	NA	. NA	NA
THALLIUM	2	2	2	6.25 U	5 U	5 U	5 U	NA	NA	NA	NA
VANADIUM				12.5 U	12.5 U	12.5 U	12.5 U	NA	NA	NA	NA
ZINC				3.59 J	1.58 J	1.52 J	1.55 J	NA	NA	. NA	NA

## ANALYTICAL RESULTS - GROUNDWATER SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 8 of 8

SAMPLE ID				DSY-GW- MW218- 030111	DSY-GW- MW219- 031611	DSY-GW- MW219- 031611-D		DSY-GW- MW220-030111	DSY-GW- MW221-030211	DSY-GW- MW222-030211	DSY-GW-MW223- 031611
TARGET AREA				BLDG. 42	BLDG. 42	BLDG. 42	BLDG 42	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRTONT (UPGRADIENT LOC.)
LOCATION ID				DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
SAMPLE DATE				03/01/11	03/16/11	03/16/11	03/16/11	03/01/11	03/02/11	03/02/11	03/16/11
SACODE				NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	FD	NM	NM	NM	NM	NM
DISSOLVED METALS (UG/L)											
ALUMINUM				29.7 J	36.9 J	38 J	37.4 J	NA	NA	NA	NA
ANTIMONY	6	6	6	2 U	2 U	2 U	2 U	NA	NA	NA NA	NA
ARSENIC	10		10	29.1	77.1 J	78.9 J	78 J	NA	NA	. NA	NA
BARIUM	2000	2000	2000	84.4	34.4	33.7	34	NA	NA	. NA	NA
BERYLLIUM	4	4	4	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA NA	
CADMIUM	5	5	5	0.5 U	1.62	1.52	1.57	NA	NA	. NA	NA
CALCIUM				76600	39400 J	39000 J	39200 J	NA	NA	. NA	NA
CHROMIUM	100	100	100	5 U	1 U	1 U	1 U	NA	NA	NA NA	
COBALT				24.2	13.7	13.6	13.6	NA	NA	. NA	NA
COPPER	1300		1300	2 U	2 U	2 U	2 U	NA	NA	. NA	NA
IRON				9900	63900 J	62600 J	63200 J	NA	NA	. NA	NA
LEAD	15	15	15	3.75 U	0.667 J	0.488 J	0.578 J	NA	NA	. NA	NA
MAGNESIUM				16200	8260 J	8090 J	8180 J	NA	NA	. NA	NA
MANGANESE				8680	4980	4610	4800	NA	NA	. NA	NA
MERCURY	2	2	2	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	. NA	NA
NICKEL		100	100	4.73	1.75 U	1.75 U	1.75 U	NA	NA	. NA	NA
POTASSIUM				10800	6390	6240	6320	NA	NA	. NA	NA
SELENIUM	50	50	50	6.25 U	1.34 J	1.44 J	1.39 J	NA	NA	. NA	NA
SILVER				2.5 U	0.5 U	0.5 U	0.5 U	NA	NA	. NA	NA
SODIUM				61900	35800	35900	35800	NA	NA	. NA	NA
THALLIUM	2	2	2	6.25 U	5 U	5 U	5 U	NA	NA	. NA	NA
VANADIUM				12.5 U	12.5 U	12.5 U	12.5 U	NA	NA	. NA	NA
ZINC				3.5 J	2.5 U	2.5 U	2.5 U	NA	NA	. NA	NA

E-4 SOIL-GAS SAMPLE ANALYTICAL DATA

#### ANALYTICAL RESULTS - SOIL-GAS SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 of 2

SAMPLE ID			DSY-SG-MW02A-	DSY-SG-MW03-	DSY-SG-MW03-	DSY-SG-MW03-	DSY-SG-	DSY-SG-MW12-
OANII EE ID			0708	0608	0608-D	0608-AVG	MW11A-0203	0506
TARGET AREA			NORTHERN	NORTHERN	NORTHERN	NORTHERN	NORTHERN	NORTHERN
			WATERFRONT	WATERFRONT	WATERFRONT	WATERFRONT	WATERFRONT	WATERFRONT
LOCATION ID			DSY-MW02A	DSY-MW03	DSY-MW03	DSY-MW03	DSY-MW11A	DSY-MW12
SAMPLE DATE			02/24/11	02/24/11	02/24/11	02/24/11	03/03/11	03/03/11
SACODE			NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
QC TYPE	VISGR1	VISGR01	NM	NM	FD	NM	NM	NM
VOLATILES (UG/M3)								
1,1,1-TRICHLOROETHANE	52000	520000	0.1 J	0.26	0.26	0.26	0.11 J	0.055 J
1,1,2,2-TETRACHLOROETHANE	0.42	4.2	0.027 U	0.028 U	0.028 U	0.028 U	0.031 U	0.034 U
1,1,2-TRICHLOROETHANE	1.5	15	0.027 U	0.028 U	0.028 U	0.028 U	0.031 U	0.034 U
1,1,2-TRICHLOROTRIFLUOROETHANE	310000	3100000	0.79 J	0.5 J	0.53 J	0.515 J	0.6 J	0.57 J
1,1-DICHLOROETHANE	15	150	0.25	0.16	0.076 J	0.118 J	0.11 J	0.086 J
1,1-DICHLOROETHENE	2100	21000	0.013 U	0.014 U	0.014 U	0.014 U	0.016 U	0.017 U
1,2,4-TRICHLOROBENZENE	21	210	2 U	2 U	2 U	2 U	2.3 U	2.5 U
1,2,4-TRIMETHYLBENZENE	73	730	0.38 J	2.4 J	0.35 UJ	1.29 J	0.58 J	1
1,2-DIBROMOETHANE	0.041	0.41	0.51 U	0.53 U	0.53 U	0.53 U	0.59 U	0.64 U
1,2-DICHLOROBENZENE	2100	21000	0.4 U	0.42 U	0.42 U	0.42 U	0.46 U	0.5 U
1,2-DICHLOROETHANE	0.94	9.4	0.013 U	0.014 U	0.014 U	0.014 U	0.016 U	0.017 U
1,2-DICHLOROPROPANE	2.4	24	0.31 U	0.32 U	0.32 U	0.32 U	0.36 U	0.39 U
1,2-DICHLOROTETRAFLUOROETHANE			0.47 U	0.49 U	0.49 U	0.49 U	0.54 U	0.59 U
1,3,5-TRIMETHYLBENZENE			0.34 U	1.1	0.35 U	0.638	0.39 U	0.3 J
1,3-BUTADIENE	0.81	8.1	3.1	2.3	2.3	2.3	13	6.4
1,3-DICHLOROBENZENE			0.4 U	0.42 U	0.42 U	0.42 U	0.46 U	0.5 U
1,4-DICHLOROBENZENE	2.2	22	0.4 U	0.42 U	0.42 U	0.42 U	0.46 U	0.5 U
1-ETHYL-4-METHYL BENZENE			0.36 J	1.5 J	0.35 UJ	0.838 J	0.47 J	1
2-BUTANONE	52000	520000	3.3	6.1	5.2	5.65	17	11
2-HEXANONE	310	3100	0.28 J	1.1 U	1.1 U	1.1 U	0.83 J	1 J
3-CHLOROPROPENE	10	100	2.1 U	0.88 U	0.88 U	0.88 U	0.98 U	1 U
4-METHYL-2-PENTANONE	31000	310000	0.87	0.26 J	0.21 J	0.235 J	0.84	0.97
ACRYLONITRILE	0.36	3.6	1.4 U	1.5 U	1.5 U	1.5 U	2.8	1.8 U
BENZENE	3.1	31	5.2	0.71	0.67	0.69	6.8	4.8
BENZYL CHLORIDE	0.5	5	0.35 U	0.36 U	0.36 U	0.36 U	0.4 U	0.44 U
BROMODICHLOROMETHANE	0.66	6.6	0.46 U	0.47 U	0.47 U	0.47 U	0.53 U	0.57 U
BROMOETHENE	0.76	7.6	2.9 U	3 U	3 U	3 U	3.4 U	3.7 U
BROMOFORM	22	220	0.7 U	0.72 U	0.72 U	0.72 U	0.81 U	0.87 U
BROMOMETHANE	52	520	0.47 U	0.49 U	0.49 U	0.49 U	0.54 U	0.59 U
CARBON TETRACHLORIDE	4.1	41	0.42 U	0.43 U	0.43 U	0.43 U	0.48 U	0.52 U
CHLOROBENZENE	520	5200	0.31 U	0.32 U	0.32 U	0.32 U	0.3 J	0.17 J
CHLORODIBROMOMETHANE	0.9	9	0.58 U	0.6 U	0.6 U	0.6 U	0.67 U	0.72 U
CHLOROETHANE	100000	1000000	0.17 U	0.18 U	0.18 U	0.18 U	1.3 J	0.6 J
CHLOROFORM	1.1	11	0.18 J	0.14 J	0.15 J	0.145 J	0.7 J	0.27 J
CHLOROMETHANE	940	9400	0.13 U	0.14 U	0.14 U	0.14 U	4.9	1.3
CIS-1,2-DICHLOROETHENE			0.14	0.062 J	0.014 U	0.0345 J	27	0.017 U
CIS-1,3-DICHLOROPROPENE			0.31 U	0.32 U	0.32 U	0.32 U	0.36 U	0.39 U
CYCLOHEXANE	63000	630000	1.8	0.24 U	0.24 U	0.24 U	0.3 J	0.44 J
DICHLORODIFLUOROMETHANE	2100	21000	2.2	3	3	3	2.4	2
ETHYLBENZENE	9.7	97	1.1	0.25 J	0.13 J	0.19 J	0.57	0.92
HEXACHLOROBUTADIENE		11	2.8 U	3 U	3 U	3 U	3.3 U	3.6 U
HEXANE	7300	73000	4.8	2.1	1.7	1.9	3.4	3

#### ANALYTICAL RESULTS - SOIL-GAS SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 of 2

WATERFRONT   DSY-MW03   DSY-MW03   DSY-MW03   DSY-MW11A   DSY-MW12   DSY-MW12   DSY-MW12   DSY-MW03   DSY-MW03   DSY-MW13   DSY-MW12   DSY-	SAMPLE ID			DSY-SG-MW02A-	DSY-SG-MW03-	DSY-SG-MW03-	DSY-SG-MW03-	DSY-SG-	DSY-SG-MW12-
WATERFRONT   DSY-MW03   DSY-MW03   DSY-MW03   DSY-MW11A   DSY-MW12   DSY-MW12   DSY-MW12   DSY-MW03   DSY-MW03   DSY-MW13   DSY-MW12   DSY-				0708	0608	0608-D	0608-AVG	MW11A-0203	0506
DSY-MW02A   DSY-MW03   DSY-MW03   DSY-MW01   DSY-MW11A   DSY-MW12	TARGET AREA			NORTHERN	NORTHERN	NORTHERN	NORTHERN	NORTHERN	NORTHERN
O2/24/11   O2/24/11   O2/24/11   O2/24/11   O2/24/11   O3/03/11				WATERFRONT	WATERFRONT	WATERFRONT	WATERFRONT	WATERFRONT	WATERFRONT
NORMAL   ORIG   DUP   AVG   NORMAL	LOCATION ID			DSY-MW02A	DSY-MW03	DSY-MW03	DSY-MW03	DSY-MW11A	DSY-MW12
VISGR1   VISGR01   NM	SAMPLE DATE			02/24/11	02/24/11	02/24/11	02/24/11	03/03/11	03/03/11
VOLATILES (UG/M3) Cont.  M+P-XYLENES  METHYL TERT-BUTYL ETHER  METHYL TERT-BUTYL ETHER  METHYLENE CHLORIDE   SACODE			NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	
Math-Paylenes   Math-Paylene	QC TYPE	VISGR1	VISGR01	NM	NM	FD	NM	NM	NM
Math-Paylenes   Math-Paylene	VOLATILES (UG/M3) Cont.								
METHYLENE CHLORIDE 52 520 0.23 U 1.5 0.65 J 1.08 J 0.8 J 1.0 N.HEPTANE 1.8 0.47 J 0.6 0.535 J 1.6 2.7 O-XYLENE 7300 73000 0.34 0.58 J 0.064 J 0.322 J 0.41 0.8 STYRENE 10000 100000 0.28 U 0.29 U 0.29 U 0.29 U 0.29 U 0.69 0.43 STETRACHLOROETHENE 4.1 41 4.7 1 1.1 1.05 12 1.5 TETRAHYDROFURAN 0.79 U 0.82 U 0.82 U 0.82 U 0.82 U 0.91 U 0.99 U 0.99 U 0.99 U 0.90 U	M+P-XYLENES			0.87	0.73 J	0.15 J	0.44 J	0.81	1.7
NHEPTANE 1.8 0.47 J 0.6 0.535 J 1.6 2.7   O-XYLENE 7300 73000 0.34 0.58 J 0.064 J 0.322 J 0.41 0.8   STYRENE 10000 100000 0.28 U 0.29 U 0.29 U 0.29 U 0.29 U 0.69 0.43   TETRACHLOROETHENE 4.1 41 4.7 1 1.1 1.05 12 1.5   TETRAHYDROFURAN 0.79 U 0.82 U 0.82 U 0.82 U 0.82 U 0.91 U 0.99 U   TOLUENE 52000 520000 7.2 0.8 0.67 0.735 2.6 3.5   TOTAL 1,2-DICHLOROETHENE 0.14 0.062 J 0.014 U 0.0345 J 31.1 0.017 U   TOTAL XYLENES 1000 10000 1.21 1.31 J 0.214 J 0.762 J 1.22 2.5   TRANS-1,2-DICHLOROETHENE 630 6300 0.013 U 0.014 U 0.014 U 0.014 U 4.1 0.017 U   TRANS-1,3-DICHLOROPROPENE 0.31 U 0.32 U 0.32 U 0.32 U 0.36 U 0.39 U   TRICHLOROETHENE 12 120 0.088 J 7.7 7.8 7.75 120 1.3   TRICHLOROFLUOROMETHANE 7300 73000 1.9 1.8 1.8 1.8 1.8 1.8 7.4	METHYL TERT-BUTYL ETHER	94	940	0.0085 J	0.014 U	0.014 U	0.014 U	0.016 U	0.015 J
O-XYLENE         7300         7300         0.34         0.58 J         0.064 J         0.322 J         0.41         0.8           STYRENE         10000         100000         0.28 U         0.29 U         0.29 U         0.29 U         0.29 U         0.69         0.43 S           TETRACHLOROETHENE         4.1         41         4.7         1         1.1         1.05         12         1.5           TETRAHYDROFURAN         0.79 U         0.82 U         0.82 U         0.82 U         0.82 U         0.91 U         0.99 U           TOLUENE         52000         520000         7.2         0.8         0.67         0.735         2.6         3.5           TOTAL 1,2-DICHLOROETHENE         0.14         0.062 J         0.014 U         0.0345 J         31.1         0.017 U           TOTAL XYLENES         1000         10000         1.21         1.31 J         0.214 J         0.762 J         1.22         2.5           TRANS-1,2-DICHLOROETHENE         630         6300         0.013 U         0.014 U         0.014 U         0.014 U         0.014 U         0.014 U         0.014 U         0.32 U         0.32 U         0.36 U         0.39 U           TRICHLOROETHENE         12         120	METHYLENE CHLORIDE	52	520	0.23 U	1.5	0.65 J	1.08 J	0.8 J	1 J
STYRENE   10000 100000   0.28 U   0.29 U   0.29 U   0.29 U   0.29 U   0.69   0.43 STETRACHLOROETHENE   4.1   41   4.7   1   1.1   1.05   12   1.5   12   1.5   12   1.5   12   1.5   12   1.5   13   1.5   14   1.5   15   15   15   15   15   15   1	N-HEPTANE			1.8	0.47 J	0.6	0.535 J	1.6	2.7
TETRACHLOROETHENE         4.1         4.1         4.7         1         1.1         1.05         12         1.5           TETRAHYDROFURAN         0.79 U         0.82 U         0.82 U         0.82 U         0.82 U         0.91 U         0.99 U           TOLUENE         52000         520000         7.2         0.8         0.67         0.735         2.6         3.5           TOTAL 1,2-DICHLOROETHENE         0.14         0.062 J         0.014 U         0.0345 J         31.1         0.017 U           TOTAL XYLENES         1000         10000         1.21         1.31 J         0.214 J         0.762 J         1.22         2.5           TRANS-1,2-DICHLOROETHENE         630         6300         0.013 U         0.014 U	O-XYLENE	7300	73000	0.34	0.58 J	0.064 J	0.322 J	0.41	0.8
TETRAHYDROFURAN         0.79 U         0.82 U         0.82 U         0.82 U         0.91 U         0.99 U           TOLUENE         52000         520000         7.2         0.8         0.67         0.735         2.6         3.5           TOTAL 1,2-DICHLOROETHENE         0.14         0.062 J         0.014 U         0.0345 J         31.1         0.017 U           TOTAL XYLENES         1000         10000         1.21         1.31 J         0.214 J         0.762 J         1.22         2.5           TRANS-1,2-DICHLOROETHENE         630         6300         0.013 U         0.014 U         0.32 U         0.32 U         0.32 U         0.32 U         0.36 U         0.39 U         0.39 U           TRICHLOROETHENE         12         120         0.088 J         7.7         7.8         7.75         120         1.3           TRICHLOROFLUOROMETHANE         7300         73000         1.9         1.8         1.8         1.8         1.8         1.8         7.4	STYRENE	10000	100000	0.28 U	0.29 U	0.29 U	0.29 U	0.69	0.43 J
TOLUENE         52000         520000         7.2         0.8         0.67         0.735         2.6         3.5           TOTAL 1,2-DICHLOROETHENE         0.14         0.062 J         0.014 U         0.0345 J         31.1         0.017 U           TOTAL XYLENES         1000         10000         1.21         1.31 J         0.214 J         0.762 J         1.22         2.5           TRANS-1,2-DICHLOROETHENE         630         6300         0.013 U         0.014 U         0.014 U         0.014 U         0.014 U         0.014 U         0.014 U         0.32 U         0.32 U         0.32 U         0.36 U         0.39 U         0.39 U           TRICHLOROETHENE         12         120         0.088 J         7.7         7.8         7.75         120         1.3           TRICHLOROFLUOROMETHANE         7300         73000         1.9         1.8         1.8         1.8         1.8         1.8         1.8         7.4	TETRACHLOROETHENE	4.1	41	4.7	1	1.1	1.05	12	1.5
TOTAL 1,2-DICHLOROETHENE         0.14         0.062 J         0.014 U         0.0345 J         31.1         0.017 U           TOTAL XYLENES         1000 10000         1.21         1.31 J         0.214 J         0.762 J         1.22         2.5           TRANS-1,2-DICHLOROETHENE         630 6300         0.013 U         0.014 U         0.032 U         0.32 U         0.32 U         0.32 U         0.36 U         0.39 U         0.39 U           TRICHLOROETHENE         12 120         0.088 J         7.7         7.8         7.75         120         1.3           TRICHLOROFLUOROMETHANE         7300 73000         1.9         1.8         1.8         1.8         1.8         1.8         1.8	TETRAHYDROFURAN			0.79 U	0.82 U	0.82 U	0.82 U	0.91 U	0.99 U
TOTAL XYLENES         1000         10000         1.21         1.31 J         0.214 J         0.762 J         1.22         2.5           TRANS-1,2-DICHLOROETHENE         630         6300         0.013 U         0.014 U         0.014 U         0.014 U         0.014 U         4.1         0.017 U           TRANS-1,3-DICHLOROPROPENE         0.31 U         0.32 U         0.32 U         0.32 U         0.32 U         0.36 U         0.39 U           TRICHLOROETHENE         12         120         0.088 J         7.7         7.8         7.75         120         1.3           TRICHLOROFLUOROMETHANE         7300         73000         1.9         1.8         1.8         1.8         1.8         1.8	TOLUENE	52000	520000	7.2	0.8	0.67	0.735	2.6	3.5
TRANS-1,2-DICHLOROETHENE         630         6300         0.013 U         0.014 U         0.014 U         0.014 U         0.014 U         4.1         0.017 U           TRANS-1,3-DICHLOROPROPENE         0.31 U         0.32 U         0.32 U         0.32 U         0.32 U         0.32 U         0.36 U         0.39 U           TRICHLOROETHENE         12         120         0.088 J         7.7         7.8         7.75         120         1.3           TRICHLOROFLUOROMETHANE         7300         73000         1.9         1.8         1.8         1.8         1.8         1.8	TOTAL 1,2-DICHLOROETHENE			0.14	0.062 J	0.014 U	0.0345 J	31.1	0.017 U
TRANS-1,3-DICHLOROPROPENE         0.31 U         0.32 U         0.32 U         0.32 U         0.32 U         0.32 U         0.36 U         0.39 U           TRICHLOROETHENE         12 120         0.088 J         7.7         7.8         7.75         120         1.3           TRICHLOROFLUOROMETHANE         7300         73000         1.9         1.8         1.8         1.8         1.8         1.8	TOTAL XYLENES	1000	10000	1.21	1.31 J	0.214 J	0.762 J	1.22	2.5
TRICHLOROETHENE         12         120         0.088 J         7.7         7.8         7.75         120         1.3           TRICHLOROFLUOROMETHANE         7300         73000         1.9         1.8         1.8         1.8         1.8         1.8         7.4	TRANS-1,2-DICHLOROETHENE	630	6300	0.013 U	0.014 U	0.014 U	0.014 U	4.1	0.017 U
TRICHLOROFLUOROMETHANE 7300 73000 1.9 1.8 1.8 1.8 1.8 7.4	TRANS-1,3-DICHLOROPROPENE			0.31 U	0.32 U	0.32 U	0.32 U	0.36 U	0.39 U
	TRICHLOROETHENE	12	120	0.088 J	7.7	7.8	7.75	120	1.3
VINYL CHLORIDE 1.6 16 0.76 0.39 J 0.15 J 0.27 J 0.49 0.32	TRICHLOROFLUOROMETHANE	7300	73000	1.9	1.8	1.8	1.8	1.8	7.4
	VINYL CHLORIDE	1.6	16	0.76	0.39 J	0.15 J	0.27 J	0.49	0.32

E-5 DATA VALIDATION MEMORANDUM



6. APPROVAL FOR TRANSMITTAL:

See #7 on Reverse for Authority to Approve Transmittals

### DECORD OF DEVIEW

DATE:

TETRA TECH NU	S, INC.				RC:	CURD	UP REV	LIEAA
1. TITLE AS IT APPEARS ON THE DOCUMENT DV Memo to T. Campbell, CTOWE Newport, Rhode Island						Naval Sta	ation Nev	vport,
Tier II Inorganic Data Validation,	SDG CT	OWE20_	005					
2. DATE OF DOCUMENT: 5/3 /"		Ε	OCUMENT	CONTROL	lo.: C- No	יאי - סגי	-11- 4	W85E
AUTHORS: J. Cardinal			INUS JOB CI					
TYPE (DRAFT, DRAFT FINAL, FINAL): Fin	nal	s	UBMITTAL D	DATE:				
3. REVIEWER AND STATUS REVIEW	ERS ASSI	GNED BY:			Date			
Assigned Reviewer	Disap	proval		ed with		Requires rification	Appro	ved By
(See Instruction #3)	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) Lung Guzman							A	J3/11
b) •							/	
c)								
d)								
4. COMMENTS (Explain conditions and comments	s, or state wh	ere commen	Is and edits a	re provided.	Attach addition	onal pages a	s needed):	
5. AUTHOR COMMENTS/RESOLUTION:								



### **TETRA TECH NUS, INC**

#### INTERNAL CORRESPONDENCE

C-NAVY-04-11-4328W

Date:

May 03, 2011

c: File G02125-4.10 (w/enc.-original)

To:

T. Campbell (w/o enc.)

From:

J. Cardinal (no copy)

Subject:

Tier II Inorganic Data Validation, SDG CTOWE20\_005

Empirical Laboratories, LLC

CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,

NAVSTA Newport, Newport, Rhode Island

Total and Dissolved Metals:

3/Groundwaters/

DSY-GW-DUP02-031611

DSY-GW-MW204-031711

DSY-GW-MW219-031611

(Field Duplicate Pair: DSY-GW-MW219-031611/DSY-GW-DUP02-031611)

1/Rinsate Blank/

DSY-GW-RB01-031611

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the target analyte list (TAL) metals analytical data for the samples in this SDG. The samples were collected as part of a Study Area Screening Evaluation at On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, Rhode Island on March 16 and 17, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The total and dissolved metal analyses were performed according to USEPA SW-846 Methods 6010C/7470A. The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs) listed in Table A-1. The data user should consider the most recent revisions to the applicable regulatory limits. The data validation was performed in accordance with the <a href="Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses">Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses</a>, Part IV, November 2008.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- Holding Times
  - Calibration Verification
- Laboratory Blank Analyses
- ICP Interference Check Sample Results
- Matrix Spike Results
- Laboratory Duplicate Results
- Laboratory Control Sample Results

Memo to T. Campbell May 03, 2011 Page 2

Field Duplicate Precision

NA

- ICP Serial Dilution Results
- Limits of Detection
- \* All quality control criteria were met for this parameter. NA Not applicable for this SDG.

#### **Laboratory Data Completeness**

The laboratory mistakenly logged in sample DSY-GW-MW204-031711 with the suffix "-031611" and the sample date 3/16/11 (actual sample date is 3/17/11). On April 25, 2011 the laboratory resubmitted all affected forms to correct the sample ID and sample date.

#### **Calibration Verification**

The following table summarizes the analytes that recovered below the 90% recovery QC limit in the continuing calibration verification:

Analyta	%R	Actio	n	Affected Comples
Analyte	7o⊓	(+)	NDs	Affected Samples
Arsenic	88.8	J	UJ	
Calcium	Calcium 89.2 J	J	UJ	
Iron	88.7	J	UJ	All total and dissolved metals samples
Magnesium	86.8, 86.2	J	UJ	

The recovery of arsenic was below the QC limit in the continuing calibration verification; therefore, the project accuracy goals may be impacted. The positive and non-detected arsenic results in all samples are usable as estimated values which may be biased low.

Although the recoveries of calcium, iron, and magnesium were below the QC limit in the continuing calibration verification, the project accuracy goals are not impacted since there are no project action limits established for these metals for the groundwater samples. The positive and non-detected calcium, iron, and magnesium results in all samples are usable as estimated values which may be biased low.

#### **Limits of Detection**

The laboratory reported non-detected metals results at the limit of detection (LOD). The positive results below the laboratory's limit of quantitation (LOQ) and above the detection limit (DL) are estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

In select samples, the nickel, silver, and/or chromium reporting limits were raised due to matrix interferences.

All PALs for the groundwater samples were met by the LODs except for thallium in select samples due to dilution. Data usability may be impacted for thallium.

Memo to T. Campbell May 03, 2011 Page 3

#### **Analytical Data Usability Assessment**

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

The project goals with respect to accuracy were met for the metals data set with the following exception. Arsenic was qualified as estimated in all samples due to a low continuing calibration verification recovery; the affected results may be biased low. Although specific method criteria were not met in this instance, the affected positive and non-detected results are usable as estimated values which may have a minor impact on data usability. In addition, calcium, iron, and magnesium were qualified as estimated in all samples due to low continuing calibration verification recoveries. Although specific method criteria were not met in this instance, data usability is not impacted and the affected positive and non-detected results are usable as estimated values.

The project goals with respect to sensitivity were met for the metals data set with the following exception. All PALs for the groundwater samples were met by the LODs except for thallium in select samples due to dilution. Data usability may be impacted for thallium.

The project goals with respect to precision and laboratory data completeness were met for the metals data set. Data usability is not impacted with regards to precision and laboratory data completeness.

Tables:

Data Validation Qualifiers and Codes

Data Summary Tables

**Enclosures:** 

**Data Validation Worksheets** 

#### **Data Validation Qualifiers and Codes**

#### **Data Validation Qualifiers:**

= No qualifier attached to value (positive hit)

J = Value is estimated

U = Value is not detected

UJ = Value is not detected and estimated

R = Value (positive hit) is not usable

UR = Value was reported as ND but is not usable

#### **Qualifier Codes:**

A = Lab Blank Contamination

B = Field Blank Contamination

C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)

C01 = GC/MS Tuning Noncompliance

D = MS/MSD Recovery Noncompliance

E = LCS/LCSD Recovery Noncompliance

F = Lab Duplicate Imprecision

G = Field Duplicate Imprecision

H = Holding Time Exceedance

I = ICP Serial Dilution Noncompliance

J = GFAA PDS - GFAA MSA's r < 0.995

K = ICP Interference - includes ICS % R Noncompliance

L = Instrument Calibration Range Exceedance

M = Sample Preservation Noncompliance

N = Internal Standard Noncompliance

N01 = Internal Standard Recovery Noncompliance Dioxins

N02 = Recovery Standard Noncompliance Dioxins

N03 = Clean-up Standard Noncompliance Dioxins

O = Poor Instrument Performance (e.g. base-line drifting)

P = Uncertainty below quantitation limit (< QL but ≥ MDL)

Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)

R = Surrogates Recovery Noncompliance

S = Pesticide/PCB Resolution

T = % Breakdown Noncompliance for DDT and Endrin

U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC

V = Non-linear calibrations; correlation coefficient r < 0.995

W = EMPC result

X = Signal to noise response drop

Y = Percent solids <30%

Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125	NSAMPLE	DSY-GW-DUF	02-031	511	DSY-GW-MW	204-031	711	DSY-GW-MW	219-03	1611	DSY-GW-RB0	1-0316	11
SDG: CTOWE20_005	LAB_ID	1103179-01			1103179-09			1103179-03			1103179-05		
FRACTION: M	SAMP_DATE	3/16/2011			3/17/2011		-	3/16/2011			3/16/2011		
MEDIA: WATER	QC_TYPE	FD			NM			NM		20.20	RB		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF	DSY-GW-MW	219-031	611									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		274			337			312			25	U	
ANTIMONY		2	U		2	U		2	U		2	U	
ARSENIC		78.1	J	С	1.5	UJ	С	74.5	J	С	1.5	UJ	С
BARIUM		34.9			11.6			34			2.5	U	
BERYLLIUM		0.5	U		0.5	U		0.5	U		0.5	U	
CADMIUM		1.41			0.5	U		1.53			0.5	U	
CALCIUM		40000	J	С	29100	J	С	38400	J	С	500	UJ	С
CHROMIUM		1	U		0.508	J	P	1	U		1	U	
COBALT		14.1			2.5	U		13.7			2.5	U	
COPPER		2	U	1	2	U		2	U		2	U	
IRON	-	65800	J	С	605	J	С	61900	J	С	11	J	CP
LEAD		1.07			0.75	U		1.28		-	0.75	U	
MAGNESIUM		8400	J	С	7110	J	С	8090	J	С	750	UJ	С
MANGANESE		4880			53.9			4510			0.959	J	Р
MERCURY		0.2	U		0.2	U		0.2	U		0.2	U	
NICKEL		1.5	U.		3.38			1.5	U		1.5		
POTASSIUM	11	6200			1660			5970			750		
SELENIUM		1.24	J	Р	1.25	U		1.55	J	P	1.25		
SILVER		0.5	U		0.5	U		0.5			0.5		
SODIUM		35400			40100			34400			750	_	
THALLIUM		5	U		1	U			U			U	
VANADIUM		12.5	U		2.5	U		12.5	U		2.5	U	
ZINC		1.52	J	Р	6.65			1.58	J	Р	1.29	J	P

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PROJ_NO: 02125	NSAMPLE	DSY-GW-DUF	179-02			204-031	711	DSY-GW-MW	219-031	611	DSY-GW-RB0	01-0316	11
SDG: CTOWE20_005	LAB_ID	1103179-02			1103179-10			1103179-04			1103179-06		
FRACTION: MF	SAMP_DATE	3/16/2011			3/17/2011		-	3/16/2011			3/16/2011		
MEDIA: WATER	QC_TYPE	FD			NM			NM			RB		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF	DSY-GW-MW	219-031	611									
PARAMETER	1174	RESULT	VQL	QLCD									
ALUMINUM		38	J	Р	72			36.9	J	Р	25		
ANTIMONY			U		2	U		2	U		2	U	
ARSENIC		78.9	J	С	1.5	UJ	С	77.1	J	С	1.5	UJ	С
BARIUM		33.7			11.5			34.4			2.5	U	
BERYLLIUM		0.5	U		0.5	U		0.5	U		0.5	U	
CADMIUM		1.52			0.5	U		1.62			0.5	U	
CALCIUM		39000	J	С	30800	J	С	39400	J	С	500	UJ	С
CHROMIUM		1	U		1	U		1	U		1	U	
COBALT		13.6			2.5	U		13.7			2.5	U	
COPPER		2	U		1.19	J	Р	2	U		2	U	
IRON		62600	J	С	50.5	J	С	63900	J	С	15	UJ	С
LEAD		0.488	J	Р	0.75	U		0.667	J	Р	0.75	U	
MAGNESIUM		8090	J	С	7450	J	С	8260	J	С	750	UJ	С
MANGANESE		4610			53.3			4980			1.5	U	
MERCURY		0.2	22		0.2			0.2	U		0.2		
NICKEL		1.75	U		3.39			1.75	U		1.5		
POTASSIUM		6240			1770			6390			750		
SELENIUM		1.44		Р	1.25			1.34		P	1.25		
SILVER		0.5	U		0.5			0.5			0.5		
SODIUM		35900			42300			35800			750	U	
THALLIUM		5	U		1	U		5	U			U	
VANADIUM		12.5	U		2.5	U		12.5	U		2.5	_	
ZINC		2.5	U		6.48			2.5	U		2.5	U	

1 of 1



### **TETRA TECH NUS, INC.**

#### **RECORD OF REVIEW**

1. TITLE AS IT APPEARS ON THE DOCUMENT – (See instruction #1 on reverse for definition of Documents):

DV Memo to T. Campbell, CTOWE20, ON SHORE DERECKTOR SHIPYARD, SITE 19, NAVAL STATION NEWPORT, NEWPORT, RHODE ISLAND

NEWPORT, NEWPORT, RHODE								
Tier II Inorganic Data Validation	n, SDG CT	OWE20_	001					
DATE OF DOCUMENT: 4/4/11			OCUMENT	CONTROL N	10.: (- N	217-6	19-11-6	1269
AUTHORS: J. Cardinal		Т	INUS JOB CI	HARGE No.:	112G02	125 - SA	.DV	
TYPE (DRAFT, DRAFT FINAL, FINAL):	Final	s	UBMITTAL C	ATE:				
REVIEWER AND STATUS REVIE	EWERS ASSI	GNED BY:			Date			
Assigned Reviewer	Disap	proval		ed with		Requires rification	Appro	ved By
(See Instruction #3)	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
Lucy Guim	us						Af	4/7/
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. COMMENTS (Explain conditions and comme	ents, or state wh	nere commeni	s and edits a	re provided.	Attach addition	onal pages as	s needed):	
AUTHOR COMMENTS/RESOLUTION:								
APPROVAL FOR TRANSMITTAL:								
			_		DATE:_			_
ee #7 on Reverse for Authority to Approve Tra	nsmittals							



### **TETRA TECH NUS, INC**

#### INTERNAL CORRESPONDENCE

C-NAVY-04-11-4269W

Date:

April 05, 2011

c: File G02125-4.10 (w/enc.-original)

To:

T. Campbell (w/o enc.)

From:

J. Cardinal (no copy)

Subject:

Tier II Inorganic Data Validation, SDG CTOWE20 001

Empirical Laboratories, LLC

CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,

NAVSTA Newport, Newport, Rhode Island

Metals:

11/Soils/

DSY-SB201-SO-0204
DSY-SB204-SO-0002
DSY-SB205-SO-0002
DSY-SB205-SO-0002
DSY-SB205-SO-0002
DSY-SB206-SO-0002
DSY-SB207-SO-0002
DSY-SB207-SO-1012

DSY-SO-DUP01-021411

(Field Duplicate Pair: DSY-SB204-SO-0002/DSY-SO-DUP01-021411)

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the target analyte list (TAL) metals analytical data for the samples in this SDG. The samples were collected as part of a Study Area Screening Evaluation at On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, Rhode Island from February 9-15, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The metal analyses were performed according to USEPA SW-846 Methods 6010C/7471A. The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs) listed in Table A-2. The data user should consider the most recent revisions to the applicable regulatory limits. The data validation was performed in accordance with the Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, Part IV, November 2008.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- Holding Times
  - Calibration Verification
  - Laboratory Blank Analyses
  - ICP Interference Check Sample Results
  - Matrix Spike Results

Memo to T. Campbell April 05, 2011 Page 2

- Laboratory Duplicate Results
- Laboratory Control Sample Results
  - Field Duplicate Precision
    - ICP Serial Dilution Results
- Percent Solids
- Limits of Detection

#### **Calibration Verification**

The following table summarizes the analytes that recovered below the 90% recovery QC limit in the continuing calibration verification:

Analyte	%R	Action		Affected Comples	
		(+)	NDs	Affected Samples	
Lead	88.4	J			
Selenium	87.1	J	UJ	All samples except DSY-SB202-SO-0204	
Zinc	87.5	J			

The recovery of lead was below the QC limit in the continuing calibration verification; therefore, the project accuracy goals may be impacted. The positive lead results in the affected samples are usable as estimated values which may be biased low.

Although the recovery of selenium and zinc was below the QC limit in the continuing calibration verification, the project accuracy goals are not impacted since the affected results are more than an order of magnitude below the PAL. The positive and non-detected selenium and zinc results in the affected samples are usable as estimated values which may be biased low.

#### **Laboratory Blank Analyses**

The following table summarizes the level of blank contamination detected in the laboratory blanks:

Analyte	Maximum Conc. (mg/kg)	Action Level (mg/kg)*	Affected Sample
Cadmium	0.0597	0.2985	DSY-SB205-SO-0002

<sup>\*</sup>The action level is based on the assumption of 2 g of sample, 100 percent solids, and a dilution factor of 1. The action level is adjusted based on sample-specific preparation factors.

The positive cadmium result below the blank action level and below the limit of detection (LOD) is changed to a non-detected value (U) at the LOD due to laboratory blank contamination.

Although cadmium contamination was found in the laboratory blanks, the project sensitivity goals are not impacted since the affected cadmium result is below the project action limit for. The affected cadmium result in sample DSY-SB205-SO-0002 is usable as a non-detected value.

#### **ICP Interference Check Sample Results**

The following results were qualified in the affected samples due to ICP interference attributed to the high concentration of iron in the samples:

<sup>\*</sup> All quality control criteria were met for this parameter.

Analyte	Act (+)	tion ND	Bias	Affected Samples
Lead	J		High	DSY-SB201-SO-0204, DSY-SB202-SO-0204, DSY-SB204-SO-0002, DSY-SB204-SO-0810, DSY-SB206-SO-0810, DSY-SB207-SO-1012, DSY-SO-DUP01-021411

The positive lead results in the affected samples are qualified as estimated (J) due to positive ICP interference attributed to iron. These results may be biased high.

There were positive ICP interferences attributed to the high concentration of iron that resulted in estimating the positive lead results in the samples listed above; therefore, the project accuracy goals may be impacted. The positive lead results in the affected samples are usable as estimated values which may be biased high.

#### **Matrix Spike Results**

The following table summarizes the analyte that recovered outside of the 80-120% recovery QC limits in the matrix spike (MS) analysis of sample DSY-SB202-SO-0204:

Analyte	MC 9/ Paggyany	Action	
Analyte	MS %Recovery	(+)	NDs
Antimony	35.1		UJ
Copper	69.2	J	
Potassium	78.7	J	
Zinc	68.5	J	

The positive and non-detected antimony, copper, potassium, and zinc results are estimated (J, UJ) in all samples due to low MS recoveries.

Although the MS percent recovery criteria were not met for antimony, copper, potassium, and zinc; the project accuracy goals are not impacted since there are no project action limits established for potassium for the soil samples and the affected antimony, copper, and zinc sample results are more than an order of magnitude below the PALs. The positive and non-detected antimony, copper, potassium, and zinc results in all samples are usable as estimated values which may be biased low.

#### **ICP Serial Dilution Results**

The following table summarizes the results in the ICP serial dilution analysis of sample DSY-SB202-SO-0204 for which the percent difference between the initial and diluted results was above the 10% QC criterion when the initial sample result was above 50 times the method detection limit (MDL):

Analyta	% Difference	Bias	Action		
Analyte	% Dillerence		(+)	NDs	
Manganese	12.5	Low	J		

The positive manganese results are estimated (J) in all samples. Since the initial sample result was lower than the diluted result, the affected sample results may be biased low.

Memo to T. Campbell April 05, 2011 Page 4

A sample matrix suppressing effect for manganese was detected in the ICP serial dilution analysis; therefore, the project accuracy goals may be impacted. The positive manganese results in all samples are usable as estimated values which may be biased low.

#### **Limits of Detection**

The laboratory reported non-detected metals results down to the limit of detection (LOD). The positive results below the laboratory's limit of quantitation (LOQ) and above the detection limit (DL) are estimated (J) due to uncertainty below the LOQ.

Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

All PALs for the soil samples were met by the LODs.

For select samples, the detection limits for silver and/or thallium were raised due to interferences. Data usability is not impacted for silver and thallium since the LODs are less than the PALs.

Cadmium in sample DSY-SB205-SO-0002 was changed to a non-detected value due to blank contamination. As discussed above in the Laboratory Blank Analyses section, data usability is not impacted.

#### **Analytical Data Usability Assessment**

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

The project goals with respect to accuracy were met for the metals data set with the following exceptions. Lead was qualified as estimated in select samples due to a low continuing calibration verification recovery; however, lead was also qualified as estimated in select samples due to positive ICP interference; consequently, the bias for the lead results is indeterminate. Manganese was qualified as estimated in all samples due to a matrix suppressing effect detected in the ICP serial dilution; the affected results may be biased low. Although specific method criteria were not met in these instances, the affected positive results are usable as estimated values which may have a minor impact on data usability. Selenium and zinc were qualified as estimated in select samples due to low continuing calibration verification recoveries. Antimony, copper, potassium, and zinc were qualified as estimated in all samples due to low MS recoveries. Although specific method criteria were not met in these instances, data usability is not impacted and the affected positive and non-detected results are usable as estimated values.

The project goals with respect to precision, sensitivity, and laboratory data completeness were met for the metals data set. Data usability is not impacted with regards to precision, sensitivity, and laboratory data completeness. Memo to T. Campbell April 05, 2011 Page 5

Tables:

Data Validation Qualifiers and Codes

**Data Summary Tables** 

Enclosures:

Data Validation Worksheets

### Data Validation Qualifiers and Codes

#### **Data Validation Qualifiers:**

= No qualifier attached to value (positive hit)

J = Value is estimated

U = Value is not detected

UJ = Value is not detected and estimated

R = Value (positive hit) is not usable

UR = Value was reported as ND but is not usable

#### **Qualifier Codes:**

A = Lab Blank Contamination

B = Field Blank Contamination

C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)

C01 = GC/MS Tuning Noncompliance

D = MS/MSD Recovery Noncompliance

E = LCS/LCSD Recovery Noncompliance

F = Lab Duplicate Imprecision

G = Field Duplicate Imprecision

H = Holding Time Exceedance

I = ICP Serial Dilution Noncompliance

J = GFAA PDS - GFAA MSA's r < 0.995

K = ICP Interference - includes ICS % R Noncompliance

L = Instrument Calibration Range Exceedance

M = Sample Preservation Noncompliance

N = Internal Standard Noncompliance

N01 = Internal Standard Recovery Noncompliance Dioxins

N02 = Recovery Standard Noncompliance Dioxins

N03 = Clean-up Standard Noncompliance Dioxins

O = Poor Instrument Performance (e.g. base-line drifting)

P = Uncertainty below quantitation limit (< QL but ≥ MDL)

Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)

R = Surrogates Recovery Noncompliance

S = Pesticide/PCB Resolution

T = % Breakdown Noncompliance for DDT and Endrin

U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC

V = Non-linear calibrations; correlation coefficient r < 0.995

W = EMPC result

X = Signal to noise response drop

Y = Percent solids <30%

Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125	NSAMPLE	DSY-SB201-S	O-0204		DSY-SB202-S	O-0204		DSY-SB204-S	O-0002		DSY-SB204-S	O-0810	1
SDG: CTOWE20_001	LAB_ID	1102160-02			1102160-01		- 200	1102160-05			1102160-03		
FRACTION: M	SAMP_DATE	2/11/2011			2/9/2011			2/14/2011			2/11/2011		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG	2000		MG/KG		
	PCT_SOLIDS	88.1			90.6			91.5		-	93.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		17400			15900			5740			3290		
ANTIMONY		0.912	UJ	D	0.858	UJ	D	0.441	UJ	D	0.425	UJ	D
ARSENIC		15.9			26.3			3.35			3.62		
BARIUM		14.6			14.8			6.46			4.5		
BERYLLIUM		0.418	J	Р	0.392	J	Р	0.243	J	Р	0.176	J	Р
CADMIUM		0.228	U		0.214	U		0.11	U		0.106	U	
CALCIUM		1770			1000			1710			443		
CHROMIUM		21.2			18.2			9.16			4.98		
COBALT		17.9			21.1			4.55			5.15		
COPPER		29.9	J	D	28.2	J	D	8.07	J	D	4.42	J	D
IRON		44400			45500			16100			9830		
LEAD		9.49	J	СК	13.6	J	K	4.18	J	CK	1.96	J	CK
MAGNESIUM		5220			4850			2120			1110		
MANGANESE		488	J	I	681	J	I	148	J	1	169	J	l
MERCURY		0.0351	U		0.0312	U		0.0292	U		0.0331	U	
NICKEL		38.6			37.9			12.2			9.68		
POTASSIUM		243	J	DP	257	J	DP	271	J	DP	219	2.5	DP
SELENIUM		0.57	UJ	С	0.536	U		0.276	UJ	С	0.16	J	СР
SILVER		0.228	U		0.214	U		0.11	U		0.106	U	
SODIUM		342	U		322	U		166	U		160	U	
THALLIUM		0.57	U		0.536	U		0.276	U		0.213	U	
VANADIUM		18.6			17.7			10.3			5.82		
ZINC		72.8	J	CD	75.7	J	D	28.1	J	CD	17.9	J	CD

PROJ_NO: 02125	NSAMPLE	DSY-SB205-S	O-0002		DSY-SB205-S	O-088.5		DSY-SB206-S	O-0002		DSY-SB206-S	O-0810	
SDG: CTOWE20_001	LAB_ID	1102160-09			1102160-10			1102160-06			1102160-07		
FRACTION: M	SAMP_DATE	2/15/2011			2/15/2011	0.00		2/14/2011			2/14/2011		
MEDIA: SOIL	QC_TYPE	NM	NM		NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.7	11333		93.3			93.0			94.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		9650	9.5		5790			5850			3190		
ANTIMONY	200	0.915	UJ	D	0.84	UJ	D	0.437	UJ	D	0.43	UJ	D
ARSENIC		9.81			7.42			2.41			4.44		
BARIUM		33.2	-		8.85			11.6			4.43		
BERYLLIUM		0.658			0.314	J	Р	0.38			0.204	J	Р
CADMIUM		0.229	UJ	AP	0.21	U		0.109	U		0.108	U	
CALCIUM		2290			1020			695			429		
CHROMIUM		16.1			9.49			9.79			5.27		
COBALT		9.56			4.54			3.94			3.68		
COPPER		39.1	J	D	12.5	J	D	6.65	J	D	5.25	J	D
IRON		27100			18300			13900			12200		
LEAD		50.6	J	С	13.8	J	С	3.38	J	СК	2.81	J	CK
MAGNESIUM		2680			1830			2300			1110		
MANGANESE		337	J	li .	145	J	I	155	J	I	95.7	J	1
MERCURY		0.037			0.0125	J	Р	0.038	U		0.03	U	
NICKEL		21.4			12.5			12			8.8		
POTASSIUM		614	J	D	248	-	DP	639	-	D	188		DP
SELENIUM		0.572	UJ	С	0.525	UJ	С	0.273	UJ	С	0.269	UJ	С
SILVER		0.229	U		0.21			0.109			0.108	U	
SODIUM		343	U		315	U		164	U		161	U	
THALLIUM		0.457	U		0.42	U		0.273	U		0.215	U	
VANADIUM		21.1			11			9.48			6.12		
ZINC		77	J	CD	36	J	CD	26.2	J	CD	21.9	J	CD

PROJ_NO: 02125	NSAMPLE	DSY-SB207-S	O-0002		DSY-SB207-S	O-1012		DSY-SO-DUP	01-021	411	
SDG: CTOWE20_001	LAB_ID	1102160-11			1102160-12			1102160-08			
FRACTION: M	SAMP_DATE	2/15/2011			2/15/2011			2/14/2011			
MEDIA: SOIL	QC_TYPE	NM			NM			FD			
	UNITS	MG/KG			MG/KG			MG/KG			
	PCT_SOLIDS	93.7			88.7			90.1			
	DUP_OF							DSY-SB204-SO-0002			
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
ALUMINUM		6720			6100			5380			
ANTIMONY		0.833	UJ	D	0.88	UJ	D	0.444	UJ	D	
ARSENIC		6.16			9.79			3.57			
BARIUM		18.2			5.11			6.2			
BERYLLIUM		0.462	J	Р	0.34	J	Р	0.234	J	Р	
CADMIUM		0.208	U		0.22	U		0.111	U		
CALCIUM		715			496	J	Р	650			
CHROMIUM		9.58			8.77			8.14			
COBALT		6.42			5.85			4.05			
COPPER		21.6	J	D	11.7	J	D	7.7	J	D	
IRON		19600		200	20900			14700			
LEAD		24.9	J	С	8.23	J	СК	3.95	J	CK	
MAGNESIUM		2100			1850			1940			
MANGANESE		149	J	ı	171	J	1	135	J.	1	
MERCURY		0.0204	J	Р	0.031	U		0.0379	U		
NICKEL		15.8		}	15			11.5			
POTASSIUM		318	J	DP	161	J	DP	287	J	D	
SELENIUM		0.52	UJ	С	0.55	UJ	С	0.277	UJ	С	
SILVER		0.208	U		0.22	U		0.111	U		
SODIUM		312	U		330	U		166	U		
THALLIUM		0.416	U		0.44	U		0.333	U		
VANADIUM		12.3			12.4			8.84			
ZINC		51.5	J	CD	41.1	J	CD	25.3	J	CD	

# EPA-NE - Data Validation Worksheet INORG-XI

# XI. ICP SERIAL DILUTIONS

M. ICI BEIGAL							
Jse a separate works	sheet for each	serial dilution s	ample.			*	
Sample No.: 58102	-0204	Matrix:		Method:	10 (		
List all serial dilution	n analytes that	t are outside met	thod QC acceptance	criteria.			
6 Difference metho	d QC acceptar	nce criteria:	10				
	-			MDL): 50× mD			
	orel			Serial Dilution	1		
Analyte	WOL	Min. Conc. Required	Sample Result	Sample Result (corrected for dilution)	% D	Action	
Be	ı	50	3.66	NO	loo	SR-Sompl, no action	
Ma	3	150	6355.2	7147	12.5	Jan (biased law)	
K	1000	50000	2393.7	ND .	100	seesomol, no action	٤.
	prep mou	- C(00000)	rated by 4				
Be	0.25	12.5	Spisompu				
M	0.15	37.5	0				
K	250	12.500	SR 450 mou				
		<u> </u>					
·							
Comments: Estin	nate positi mate posit	ive rusuits tive and no	(J) if %D:	>15 and dilu esults (J,uJ)	tian result if 1.0 > 15	- 4 somple result (biosed high) matrix: and dilution result > 5 ample result (biosed low) matrix supressing	enhai
Validator:						Date:	



# TETRA TECH NUS, INC.

# **RECORD OF REVIEW**

1. TITLE AS IT APPEARS ON THE DOCUMENT - (See instruction #1 on reverse for definition of Documents):

DV Memo to T. Campbell, CTOWE20, On Shore Derecktor Shipyard, Site 19, Naval Station Newport, Newport, Rhode Island

Tier II Organic Data Validation, SDG 1103242 (Air samples)

DATE OF DOCUMENT: $5/3/11$		0	DOCUMENT CONTROL No.: C- Nary - 05-11-4331								
AUTHORS: J. Cardinal		T	THNUS JOB CHARGE No.: 112G02125 - SA.DV								
TYPE (DRAFT, DRAFT FINAL, FINAL): Fin	ıal	s	UBMITTAL C	DATE:							
REVIEWER AND STATUS REVIEW	ERS ASSI	GNED BY:			Date	-					
Assigned Reviewer	Disap	proval		red with		Requires	Appro	ved By			
(See Instruction #3)	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)			
Lucy Guzman							H	5/5/11			
							1				
					-						
COMMENTS (Explain conditions and comments	, or state wh	ere commen	ls and edits a	are provided.	Attach addition	onal pages a	s needed):				
AUTHOR COMMENTS/RESOLUTION:											
ACTION COMMENTAINESCENTION.											
APPROVAL FOR TRANSMITTAL:			-	1.00			*	-			
	4	Ę	_		DATE:						
ee #7 on Reverse for Authority to Approve Trans	mittals		**								



# **TETRA TECH NUS, INC**

# INTERNAL CORRESPONDENCE

C-NAVY-05-11-4331W

Date:

May 05, 2011

c: File G02125-4.10 (w/enc.-original)

To:

T. Campbell (w/o enc.)

From:

J. Cardinal (no copy)

Subject:

Tier II Organic Data Validation, SDG 1103242

Air Toxics LTD

CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,

NAVSTA Newport, Newport, Rhode Island

VOC:

5/Air (SUMMA canisters)/

DSY-SG-DUP01-0211

DSY-SG-MW02A-0708 DSY-SG-MW11A-0203

DSY-SG-MW03-0608

DSY-SG-MW12-0506

(Field Duplicate Pair: DSY-SG-MW03-0608/DSY-SG-DUP01-0211)

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compound (VOC) analytical data for the air samples collected at the On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI site on February 24 and March 3, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to Method TO-15 in both the full scan and selective ion monitoring (SIM) modes. The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs). The data user should consider the most recent revisions to the applicable regulatory limits. The VOC data validation was performed in accordance with the <a href="Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses">Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses</a>, December 1996.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- Preservation and Technical Holding Times
- GC/MS Instrument Performance Check (Tuning)
- Initial and Continuing Calibrations
- Blanks
- Surrogate Compounds
  - Internal Standards
- Laboratory Duplicates
- Laboratory Control Sample/Laboratory Control Sample Duplicate
  - Field Duplicates

Memo to T. Campbell May 05, 2011 Page 2

- Limits of Detection
  - \* All criteria were met for this parameter.

# **Laboratory Data Completeness**

On April 11, 2011 the laboratory submitted the instrument method detection limits (MDLs) in units of  $\mu g/m3$  since the sample results are reported down to the MDLs. The laboratory does not currently have a way to populate the report with MDLs in units of  $\mu g/m3$ .

On April 21, 2011 the laboratory resubmitted all affected forms to report the non-detected values at the LOD, except the non-standard compounds acrylonitrile and vinyl bromide. The LODs for non-standard compounds are listed as "NA" in the Forms I. Tetra Tech Chemist J. Cardinal used professional judgment to report non-detects for acrylonitrile and vinyl bromide at the reporting limit (LOQ) in the summary data tables.

#### **Field Duplicates**

The field duplicate pair DSY-SG-MW03-0608/DSY-SG-DUP01-0211 did not meet the field duplicate QC criteria of RPD <30% for the following compounds:

Analyte	Sample Result	Duplicate Result	RPD	Action		
Analyte	(μg/m3)	(μg/m3)	NFD	(+)	NDs	
Vinyl chloride	0.39	0.15	89	J		
Ethylbenzene	0.25	0.13	63	J		
m+p-Xylenes	0.73	0.15 J	132	J		
o-Xylene	0.58	0.064 J	160	J		
4-Ethyltoluene	1.5	0.68 U	NC	J	UJ	
1,2,4-Trimethylbenzene	2.4	0.68 U	NC	J	UJ	

J – Result is estimated.

In addition, the 4-ethyltoluene and 1,2,4-trimethylbenzene sample results are greater than 2x the reporting limit while the duplicate results are non-detect.

Although vinyl chloride, ethylbenzene, m+p-xylenes, o-xylene, 4-ethyltoluene, and 1,2,4-trimethylbenzene did not meet the field duplicate QC criteria, the project precision goals are not impacted since either there are no project action limits established for these compounds for the air samples or the affected sample results are much lower than the project action limits. The positive and non-detected vinyl chloride, ethylbenzene, m+p-xylenes, o-xylene, 4-ethyltoluene, and 1,2,4-trimethylbenzene results in samples DSY-SG-MW03-0608 and DSY-SG-DUP01-0211 are usable as estimated values for which the bias is indeterminate.

### **Limits of Detection**

Non-detected results were reported at the laboratory's limit of detection (LOD) except for the non-standard compounds acrylonitrile and vinyl bromide for which the non-detected results were reported at the laboratory's limit of quantitation (LOQ, or RL). Positive results below LOQ and above the

U - Result is not detected.

NC - Not calculated.

Memo to T. Campbell May 05, 2011 Page 3

laboratory's method detection limit (MDL) were qualified as estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) are evaluated for non-detected values only (reported at the MDL).

All PALs were met by the MDLs except for 1,2-dibromoethane, acrylonitrile, and hexachlorobutadiene. Data usability may be impacted for these compounds.

# Analytical Data Usability Assessment

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

The project goals with respect to accuracy were met for the volatiles data set. Data usability is not impacted with regards to accuracy.

The project goals with respect to precision were met for the volatiles data set. Vinyl chloride, ethylbenzene, m+p-xylenes, o-xylene, 4-ethyltoluene, and 1,2,4-trimethylbenzene were qualified as estimated in samples DSY-SG-MW03-0608 and DSY-SG-DUP01-0211 due to poor field duplicate precision. Although the QC criteria were not met in this instance, data usability is not impacted and the affected positive and non-detected results are usable as estimated values.

The project goals with respect to sensitivity were met for the volatiles data set with the following exception. All PALs were met by the MDLs except for 1,2-dibromoethane, acrylonitrile, and hexachlorobutadiene. Data usability may be impacted for these compounds.

The project goals with respect to laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to laboratory data completeness.

Tables:

Data Summary Tables

Data Validation Qualifiers and Codes

Enclosures:

**Data Validation Worksheets** 

# Data Validation Qualifiers and Codes

# **Data Validation Qualifiers:**

= No qualifier attached to value (positive hit)

J = Value is estimated

U = Value is not detected

UJ = Value is not detected and estimated

R = Value (positive hit) is not usable

UR = Value was reported as ND but is not usable

#### **Qualifier Codes:**

A = Lab Blank Contamination

B = Field Blank Contamination

C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)

C01 = GC/MS Tuning Noncompliance

D = MS/MSD Recovery Noncompliance

E = LCS/LCSD Recovery Noncompliance

F = Lab Duplicate Imprecision

G = Field Duplicate Imprecision

H = Holding Time Exceedance

1 = ICP Serial Dilution Noncompliance

J = GFAA PDS - GFAA MSA's r < 0.995

K = ICP Interference - includes ICS % R Noncompliance

L = Instrument Calibration Range Exceedance

M = Sample Preservation Noncompliance

N = Internal Standard Noncompliance

N01 = Internal Standard Recovery Noncompliance Dioxins

N02 = Recovery Standard Noncompliance Dioxins

N03 = Clean-up Standard Noncompliance Dioxins

O = Poor Instrument Performance (e.g. base-line drifting)

P = Uncertainty below quantitation limit (< QL but ≥ MDL)

Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)

R = Surrogates Recovery Noncompliance

S = Pesticide/PCB Resolution

T = % Breakdown Noncompliance for DDT and Endrin

U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC

V = Non-linear calibrations; correlation coefficient r < 0.995

W = EMPC result

X = Signal to noise response drop

Y = Percent solids <30%

Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125	NSAMPLE					DSY-SG-MW03-0608			DSY-SG-MW11A-0203				
SDG: 1103242	LAB_ID	1103242R1-01	A		1103242R1-02	2A		1103242R1-03	3A	******	1103242R1-04	4A	
FRACTION: OV	SAMP_DATE	2/24/2011			2/24/2011			2/24/2011		. 12	3/3/2011		
MEDIA: AIR	QC_TYPE	FD			NM			NM		**	NM		77.77.4
	UNITS	UG/M3			UG/M3			UG/M3	0.41.4.7		UG/M3		
11	PCT_SOLIDS								*****	· x			-7
	DUP_OF	DSY-SG-MW0	3-0608								-		
PARAMETER ,		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE	Ē	0.26			0.1	J	Р	0.26			0.11	J	Р
1,1,2,2-TETRACHLOROET	HANE	0.028	υ		0.027	υ		0.028	U		0.031	U	
1,1,2-TRICHLOROETHANE	:	0.028	υ		0.027	U		0.028	U		0.031	U	
1,1,2-TRICHLOROTRIFLUC	DROETHANE	0.53	J	Р	0.79	J	Р	0.5	J	Р	0.6	J	Р
1,1-DICHLOROETHANE	-	0.076	J	Р	0.25			0.16			0.11	J	Р
1,1-DICHLOROETHENE		0.014	υ		0.013	U	20 p. 19.	0.014	U		0.016	U	7 100
1,2,4-TRICHLOROBENZEN	1E	2	U		2	U		2	U		2.3	U	
1,2,4-TRIMETHYLBENZEN	E	0.35	UJ	G	0.38	J	Р	2.4	J	G	0.58	J	Р
1,2-DIBROMOETHANE		0.53	U		0.51	U		0.53	υ	*	0.59	υ	
1,2-DICHLOROBENZENE		0.42	U		0.4	U		0.42	U		0.46	υ	
1,2-DICHLOROETHANE		0.014	υ		0.013	υ		0.014	υ		0.016	υ	
1,2-DICHLOROPROPANE		0.32	U		0.31	υ		0.32	υ		0.36	υ	
1,2-DICHLOROTETRAFLUC	OROETHANE	0.49	υ		0.47	U		0.49	U		0.54	υ	
1,3,5-TRIMETHYLBENZENI	E	0.35	υ		0.34	υ		1.1			0.39	U	
1,3-BUTADIENE		2.3			3.1			2.3			13		
1,3-DICHLOROBENZENE		0.42	U		0.4	U		0.42	υ		0.46	υ	
1,4-DICHLOROBENZENE		0.42	U		0.4	U	30 % Research 25/27/27/27/27/20	0.42	υ		0.46	υ	
1-ETHYL-4-METHYL BENZ	ENE	0.35	UJ	G	0.36	J .	Р	1.5	J	G	0.47	J	Р
2-BUTANONE		5.2			3.3			6.1			17		
2-HEXANONE	2000	1.1	U		0.28	J	Р	1.1	υ		0.83	J	Р
3-CHLOROPROPENE		0.88	U		2.1	U		0.88	U		0.98	υ	
4-METHYL-2-PENTANONE		0.21	J	Р	0.87		10.0	0.26	J	Р	0.84		
ACRYLONITRILE		1.5	U		1.4	U		1.5	U		2.8		
BENZENE		0.67			5.2			0.71			6.8		
BENZYL CHLORIDE		0.36			0.35	U		0.36			0.4	100000	
BROMODICHLOROMETHA	NE	0.47			0.46	U		0.47			0.53		
BROMOETHENE		3	U		2.9			3	U		3.4	U	
BROMOFORM		0.72		14	0.7			0.72			0.81		
BROMOMETHANE		0.49		3 - 32 CBC	0.47	1		0.49			0.54		
CARBON TETRACHLORIDI	E	0.43			0.42			0.43			0.48		
CHLOROBENZENE		0.32			0.31			0.32	l		0.3	1	P
CHLORODIBROMOMETHA	NE	0.6			0.58			0.6			0.67		
CHLOROETHANE	12	0.18			0.17	υ		0.18			1.3		Р
CHLOROFORM		0.15		Р	0.18		Р	0.14		Р	0.7		Р
CHLOROMETHANE		0.14	U		0.13	U		0.14	U		4.9		

				1 12				
PROJ_NO: 02125	NSAMPLE	DSY-SG-MW12-0506						
SDG: 1103242	LAB_ID	1103242R1-05	δA					
FRACTION: OV	SAMP_DATE	3/3/2011						
MEDIA: AIR	QC_TYPE	NM	NM					
	UNITS	UG/M3						
	PCT_SOLIDS							
	DUP_OF			177				
PARAMETER		RESULT	VQL	QLCD				
1,1,1-TRICHLOROETHANE		0.055	J	P				
1,1,2,2-TETRACHLOROETH	HANE	0.034	U					
1,1,2-TRICHLOROETHANE		0.034	U					
1,1,2-TRICHLOROTRIFLUC	ROETHANE	0.57	J	P				
1,1-DICHLOROETHANE		0.086	J	Р				
1,1-DICHLOROETHENE		0.017	U					
1,2,4-TRICHLOROBENZEN	E	2.5	U					
1,2,4-TRIMETHYLBENZEN	=	1						
1,2-DIBROMOETHANE		0.64	U					
1,2-DICHLOROBENZENE		0.5	U					
1,2-DICHLOROETHANE		0.017	U					
1,2-DICHLOROPROPANE		0.39	U					
1,2-DICHLOROTETRAFLUC	PROETHANE	0.59	U					
1,3,5-TRIMETHYLBENZENE	=	0.3	J	Р				
1,3-BUTADIENE		6.4						
1,3-DICHLOROBENZENE		0.5	U					
1,4-DICHLOROBENZENE		0.5	υ					
1-ETHYL-4-METHYL BENZE	ENE	1						
2-BUTANONE		11						
2-HEXANONE		1	J	Р				
3-CHLOROPROPENE		1	U					
4-METHYL-2-PENTANONE		0.97						
ACRYLONITRILE		1.8	U					
BENZENE		4.8						
BENZYL CHLORIDE		0.44	U					
BROMODICHLOROMETHA	NE	0.57	U					
BROMOETHENE		3.7	U					
BROMOFORM		0.87	U					
BROMOMETHANE		0.59	U					
CARBON TETRACHLORIDE	<b>=</b>	0.52	U					
CHLOROBENZENE		0.17		Р				
CHLORODIBROMOMETHA	NE	0.72	U					
CHLOROETHANE		0.6	J	Р				
CHLOROFORM		0.27	J	Р				
CHLOROMETHANE		1.3						

PROJ_NO: 02125	NSAMPLE	DSY-SG-DUP	01-0211		DSY-SG-MW0	2A-070	3	DSY-SG-MW0	3-0608		DSY-SG-MW1	1A-020	3
SDG: 1103242	LAB_ID	1103242R1-01	IA		1103242R1-02	2A	× 70	1103242R1-03	A		1103242R1-04	Α	
FRACTION: OV	SAMP_DATE	2/24/2011			2/24/2011	_		2/24/2011			3/3/2011		
MEDIA: AIR	QC_TYPE	FD		NM	-		NM			NM			
	UNITS	UG/M3			UG/M3			UG/M3			UG/M3		
	PCT_SOLIDS		84					55000369					
DUP_OF		DSY-SG-MW03-0608											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CIS-1,2-DICHLOROETH	IENE	0.014			0.14			0.062	J	Р	27		
CIS-1,3-DICHLOROPRO	PENE	0.32	U		0.31	U		0.32	U		0.36	U	
CYCLOHEXANE		0.24	U		1.8			0.24	U		0.3	J	Р
DICHLORODIFLUORON	METHANE	3			2.2			3			2.4		1
ETHYLBENZENE		0.13		G	1.1			0.25	J	G	0.57		
HEXACHLOROBUTADIE	ENE	4	U		2.8	U		3	U		3.3	U	
HEXANE		1.7			4.8			2.1			3.4		
M+P-XYLENES		0.15	J	GP	0.87			0.73	J	G	0.81		
METHYL TERT-BUTYL I	ETHER	0.014	U		0.0085	J	Р	0.014	U	-	0.016	U	
METHYLENE CHLORID	E	0.65	J	P	0.23	U	1 (146)/1467/Spx1546/8 (44)/47/57/53550 (44),55	1.5			0.8	J	Р
N-HEPTANE		0.6			1.8			0.47	J	P	1.6		
O-XYLENE		0.064	J	GP	0.34			0.58	J	G	0.41		
STYRENE		0.29	U		0.28	U		0.29	U		0.69		
TETRACHLOROETHEN	E	1.1			4.7			1			12		
TETRAHYDROFURAN		0.82	U		0.79	U		0.82	U		0.91	U	
TOLUENE		0.67			7.2			0.8			2.6		
TRANS-1,2-DICHLORO	ETHENE	0.014	U		0.013	U		0.014	U		4.1		
TRANS-1,3-DICHLOROI	PROPENE	0.32			0.31			0.32	U		0.36	U	
TRICHLOROETHENE		7.8			0.088	J	Р	7.7			120		
TRICHLOROFLUOROM	ETHANE	1.8			1.9		77	1.8			1.8		
VINYL CHLORIDE		0.15	J	G	0.76			0.39	J	G	0.49		

PROJ_NO: 02125	NSAMPLE	DSY-SG-MW1	2-0506					
SDG: 1103242	LAB_ID	1103242R1-05	iΑ					
FRACTION: OV	SAMP_DATE	3/3/2011		****				
MEDIA: AIR	QC_TYPE	NM						
	UNITS	UG/M3						
	PCT_SOLIDS							
	DUP_OF							
PARAMETER		RESULT	VQL	QLCD				
CIS-1,2-DICHLOROETHEN	E	0.017	U					
CIS-1,3-DICHLOROPROPE	NE	0.39	U	:				
CYCLOHEXANE		0.44	J	Р				
DICHLORODIFLUOROMET	THANE	2						
ETHYLBENZENE		0.92						
HEXACHLOROBUTADIEN	<b>∃</b>	3.6	U					
HEXANE		3	i R					
M+P-XYLENES		1.7						
METHYL TERT-BUTYL ETI	HER	0.015	J	Р				
METHYLENE CHLORIDE		1	J	Р				
N-HEPTANE		2.7						
O-XYLENE		0.8						
STYRENE		0.43	J	Р				
TETRACHLOROETHENE	77.77	1.5						
TETRAHYDROFURAN		0.99	U					
TOLUENE		3.5						
TRANS-1,2-DICHLOROETI	HENE	0.017						
TRANS-1,3-DICHLOROPRO	OPENE	0.39	U					
TRICHLOROETHENE		1.3						
TRICHLOROFLUOROMET	HANE	7.4						
VINYL CHLORIDE	1	0.32						



### TETRA TECH NUS, INC.

# **RECORD OF REVIEW**

	<del>-,</del>							
1. TITLE AS IT APPEARS ON THE DOCUMENT	- (See instru	ction #1 on re	everse for del	inition of Doc	cuments):			
DV Memo to T. Campbell, CTOWN NEWPORT, NEWPORT, RHODE I	E20, ON S SLAND	SHORE D	ERECKT	OR SHIF	YARD, S	SITE 19, N	NAVAL S	TATION
Tier II Organic Data Validation, S	DG CTO	WE20_0	02					
2. DATE OF DOCUMENT: 418711	4/191	111	OCUMENT	CONTROL N	6.: C-NC	14-07	1-11-4:	292 u
AUTHORS: J. Cardinal			INUS JOB C	HARGE No.:	112G02	125 - SA	.DV	
TYPE (DRAFT, DRAFT FINAL, FINAL): Fi	nal	S	SUBMITTAL (	DATE:				
3. REVIEWER AND STATUS REVIEW	ERS ASSI	GNED BY:			Date			
Assigned Reviewer	Disap	proval		ed with		Requires erification	Appro	oved By
(See Instruction #3)	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) Lucy Guzman							A	4/18/11
b)						Ke -	ff	1/19/11
c)							l V	
d)								
4. COMMENTS (Explain conditions and comment	s, of state wh	ere commen	ts and edits a	sre provided.	Attach additi	onal pages a	s needed):	
5. AUTHOR COMMENTS/RESOLUTION:								
6. APPROVAL FOR TRANSMITTAL:	3				DATE:			
See #7 on Payeres for Authority to Approve Trans	mittale							



# **TETRA TECH NUS, INC**

### INTERNAL CORRESPONDENCE

C-NAVY-04-11-4292W

Date:

April 19, 2011

c: File G02125-4.10 (w/enc.-original)

To:

T. Campbell (w/o enc.)

From:

J. Cardinal (no copy)

Subject:

Tier II Organic Data Validation, SDG CTOWE20 002

Empirical Laboratories, LLC

CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,

NAVSTA Newport, Newport, Rhode Island

VOC:

2/Groundwaters/ DSY-GW-MW02A-022411

DSY-GW-MW03-022411

1/Trip Blank/

DSY-GW-TB01-022411

PAH/PCB/GRO/DRO:

8/Soils/

DSY-SO-DUP02-0211 DSY-SO-SB208-000.5 DSY-SO-SB209-0.30.7 DSY-SO-SB210-0102 DSY-SO-SB211-0102 DSY-SO-SB212-0204 DSY-SO-SB213-0203 DSY-SO-SB214-0203

(Field Duplicate Pair: DSY-SO-SB208-000.5/DSY-SO-DUP02-0211)

GRO:

1/Trip Blank/

DSY-SO-TB02-022511

PCB:

5/Soils/

DSY-SO-DUP01-022211

DSY-SO-SB215-000.5 DSY-SO-SB217-000.5

DSY-SO-SB216-000.5 DSY-SO-SB224-000.5

(Field Duplicate Pair: DSY-SO-SB224-000.5/DSY-SO-DUP01-022211)

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), diesel range organic (DRO; C8-C40), and gasoline range organic (GRO; C6-C10) analytical data for the samples in this SDG. The samples were collected at the On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI from February 22 - 25, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to USEPA SW-846 Method 8260B. The PAH analysis was performed according to USEPA SW-846 Method 8270C. The PCB analysis was performed according to USEPA SW-846 Method 8082A. The DRO and GRO analyses were performed according to USEPA SW-846 Method 8015B.

The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs) listed in Table A-2. The data user should consider the most recent revisions to the applicable regulatory limits. The VOC, PAH, GRO, and DRO data validation was performed in accordance with the <u>Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses</u>, December 1996. The PCB data validation was performed according to the <u>Region I, EPA-NE Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses</u>, Part III, February 2004.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- Preservation and Technical Holding Times
- GC/MS Instrument Performance Check (Tuning)
  - Initial and Continuing Calibrations
- Blanks
  - Surrogate Compounds
- Internal Standards
  - Matrix Spike/Matrix Spike Duplicate
- Laboratory Control Sample/Laboratory Control Sample Duplicate
  - Field Duplicates
  - Analyte Identification/Quantitation
- Percent Solids
  - Limits of Detection
    - \* All criteria were met for this parameter.

#### **Laboratory Data Completeness**

#### **Volatiles**

On April 6, 2011 the laboratory resubmitted the preparation bench sheets for the volatile samples to show that the pH of the samples was  $\leq 2$  since this was not provided in the original data package.

#### **PCB**

On April 6, 2011 the laboratory resubmitted the case narrative to note that sample DSY-SO-SB214-0203 surrogates were outside limits on both columns. The laboratory suspected matrix interferences for this sample. On April 6, 2011 the laboratory further clarified in an email that the non-compliance was evaluated the day after the holding time expired. Since the sample was outside holding time and the recovery was not rejectable (>10%), no further action was taken by the laboratory. On April 11, 2011 Tetra Tech Chemist, J. Cardinal, instructed the laboratory that, in the future, samples with recoveries outside the QC limits on both columns need to be re-extracted and re-analyzed. In addition, the Tetra Tech Statement of Work listed the PCB holding time as "none" for this project. No further action was taken.

On April 11, 2011 the laboratory clarified that all TCMX results were removed from the PCB section of the data package in the resubmitted package since TCMX is not applicable to the PCB analysis. On April 12, 2011 the laboratory submitted all revised forms.

On April 6, 2011 the laboratory resubmitted select PCB initial calibration pages since the original pages did not have the correct analysis date and the data set was not complete. On April 12, 2011 the laboratory resubmitted the affected forms to correct the page numbers since the page numbers were not correct in the resubmittal.

#### PAH

On April 18, 2011 the laboratory informed Tetra Tech that a calibration error for low-level PAHs affected the soil samples in this SDG. The reported LOQs were not supported by the low standard of the calibration curve. On April 19, 2011 the laboratory resubmitted the Analysis Data Sheets (Form 1s) for all PAH samples in this SDG to show the correct LOQs. The data summary tables were edited to include additional "J" values due to a higher LOQ. The edited data summary tables have been added to the data validation memorandum.

# **Initial and Continuing Calibrations**

#### **Volatiles**

The following table summarizes the volatile compounds that failed to meet the continuing calibration (CC) criterion of D < 20 for CCCs and D < 25 for all other compounds:

Compound	%D	Action		Affected Samples
Compound	70D	(+)	NDs	Affected Samples
Acetone	34.1	-	UJ	
Bromodichloromethane	28.6		UJ	
Carbon tetrachloride	36.3		UJ	All comples
1,2-Dichloroethane	39.1		UJ	All samples
1,1,1-Trichloroethane	32.0		UJ	
Trichlorotrifluoromethane	27.2		UJ	

Although the %D was outside of the QC limit for acetone, bromodichloromethane, carbon tetrachloride, 1,2-dichloroethane, 1,1,1-trichloroethane, and trichlorotrifluoromethane; the project accuracy goals are not impacted since the affected sample results are more than an order of magnitude below the PAL or there are no regulatory limits established for the compounds. Also, there are no regulatory limits established for the trip blank sample. The non-detected acetone, bromodichloromethane, carbon tetrachloride, 1,2-dichloroethane, 1,1,1-trichloroethane, and trichlorotrifluoromethane results in the affected samples are usable as estimated values.

#### GRO

The following table summarizes the hydrocarbon range that failed to meet the continuing calibration (CC) criterion of %D <20:

Hudroperhan Rango	%D	Action	Affected Sample
Hydrocarbon Range	70D	(+) NDs	Affected Sample
GRO	-71.7	UJ	DSY-SO-SB214-0203RE

Although the %D was outside of the QC limit for GRO, the project accuracy goals are not impacted since the affected sample result is more than an order of magnitude below the PAL. The non-detected GRO result in the affected sample is usable as an estimated value.

#### **PCB**

The following table summarizes the Aroclor that failed to meet the continuing calibration (CC) criterion of %D <20:

Aroclor	Col. 1	Col. 2	Ac	tion	Affected Samples
Arocioi	%D	%D	(+)	NDs	Affected Samples
Aroclor-1016	21.44, 21.04, 27.14	-26.82, -26.68, -28.42		ΟĴ	All samples except DSY-SO-SB213-0203, DSY-SO-SB214-0203

Although the %D was outside of the QC limit for Aroclor-1016, the project accuracy goals are not impacted since the affected sample results are more than an order of magnitude below the PAL. The non-detected Aroclor-1016 results in the affected samples are usable as estimated values.

#### **Surrogate Compounds**

#### **PCB**

The following sample had surrogate spike recoveries outside of the recovery limits:

Comple		QC Limits: 60-125)	Ac	tion
Sample	Column 1	Column 2	(+)	NDs
DSY-SO-SB214-0203	37.2	36.5		UJ

Although the surrogate recovery QC criteria were not met for decachlorobiphenyl (DCB) in the affected sample, the project accuracy goals are not impacted since the sample results are more than an order of magnitude below the PALs. The non-detected PCB Aroclor results in sample DSY-SO-SB214-0203 are usable as estimated values which may be biased low.

# Matrix Spike/Matrix Spike Duplicate

#### PAH

The following table summarizes the results of the matrix spike and/or matrix spike duplicate (MS/MSD) analysis of sample DSY-SO-SB208-000.5 that were outside of the QC limit:

Compound	MS/MSD	%Rec.	RPD	RPD	A	ction
Compound	%Rec.	QC Limits	nru	QC Limit	(+)	NDs
Benzo(a)anthracene	-20.3/-23.6	31-146	-	-	J	
Benzo(a)pyrene	-9.25/-7.96	28-128	-	-	J	
Benzo(b)fluoranthene	-52.1/-42.8	30-139	-	-	J	
Chrysene	-34.4/-41.9	39-134	-	•	J	
Phenanthrene	-97.5/-127	32-127	-	-	J	
Pyrene	-78.7/-89.7	28-130	-	-	J	
Benzo(g,h,i)perylene	-/14.2	21-149	-	-	J	
2-Methylnaphthalene	-	-	38.0	30	J	
Naphthalene		_	41.6	30	J	

<sup>-</sup>Criterion met

The MS/MSD recoveries for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene did not meet the QC limit; therefore, the project accuracy goals may be impacted. The positive benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene results in sample DSY-SO-SB208-000.5 are usable as estimated values which may be biased low.

Although the MS/MSD recoveries for phenanthrene, pyrene, and benzo(g,h,i)perylene did not meet the QC limit; the project accuracy goals are not impacted since the affected sample results are more than an order of magnitude below the PALs. The positive phenanthrene, pyrene, and benzo(g,h,i)perylene results in sample DSY-SO-SB208-000.5 are usable as estimated values which may be biased low.

Although the MS/MSD relative percent differences for 2-methylnaphthalene and naphthalene did not meet the QC limits; the project precision goals are not impacted since the affected sample results are more than an order of magnitude below the PALs. The positive 2-methylnaphthalene and naphthalene results in sample DSY-SO-SB208-000.5 are usable as estimated values for which the bias is indeterminate.

#### **Field Duplicates**

#### No.

PAH

The field duplicate pair DSY-SO-SB208-000.5/DSY-SO-DUP02-0211 exceeded the relative percent difference QC criterion of 50% for the following compounds:

Analyta	Sample Result	Duplicate Result	RPD	Ac	tion
Analyte	(μg/kg)	(μg/kg)	NPD	(+)	NDs
Anthracene	45.1	3.94 U	NC	J	UJ
Acenaphthene	36.7	10.0	114	J	
Benzo(a)anthracene	149	51.5	97	J	
Benzo(a)pyrene	129	46.3	94	J	
Benzo(b)fluoranthene	194	67.4	63	J	
Benzo(g,h,i)perylene	59.5	28.4	71	J	
Benzo(k)fluoranthene	71.2	28.8	85	J	
Chrysene	161	48.1	108	J	
Fluoranthene	3650	103	109	J	
Indeno(1,2,3-cd)pyrene	55.1	23.5	80	J	
2-Methylnaphthalene	33.1	18.8	55	J	

Analyta	Sample Result	Duplicate Result	RPD	Action		
Analyte	(µg/kg)	(μg/kg)	RPD	(+)	NDs	
Phenanthrene	280	77.9	113	J		
Pyrene	264	79.1	108	J		

J – Result is estimated.

In addition, the sample result for anthracene is greater than 2x the limit of quantitation (LOQ) while the duplicate result is non-detect.

The field duplicate relative percent difference for the compounds listed above exceeded the QC criterion; therefore, the project precision goals may be impacted. The affected positive and non-detected results in samples DSY-SO-SB208-000.5 and DSY-SO-DUP02-0211 are usable as estimated values for which the bias is indeterminate.

### Analyte Identification/Quantitation

#### **PCB**

The %RPD between the results of analytical columns 1 and 2 exceeded the 40% RPD QC criterion for the compounds in the following samples:

Sample	Analyte	%RPD	Action (+)
DSY-SO-DUP02-0211	Aroclor-1260	51	J
DSY-SO-SB208-000.5	Aroclor-1260	56	J
DSY-SO-SB209-0.30.7	Aroclor-1260	62	J

The analyte quantitation relative percent differences exceeded the 40% RPD QC limit for the sample listed above; therefore, the project accuracy goals may be affected due to analytical interferences detected in the dual column analysis. The positive Aroclor-1260 results in the affected samples are usable as estimated values.

#### **Limits of Detection**

All non-detected results were reported at the limit of detection (LOD). Positive results above the detection limit (DL) and below the limit of quantitation (LOQ) were qualified as estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

There are no PALs established for the trip blank samples.

#### **Volatiles**

All PALs for the groundwater samples were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

U – Not detected.

NC - Not calculated.

#### PAH/DRO/GRO/PCB

All PALs for PAH, DRO, GRO, and PCBs for the soil samples were met by the LODs.

# **Analytical Data Usability Assessment**

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

#### **Volatiles**

The project goals with respect to accuracy were met for the volatiles data set. Acetone, bromodichloromethane, carbon tetrachloride, 1,2-dichloroethane, 1,1,1-trichloroethane, and trichlorotrifluoromethane were qualified as estimated in all samples due to poor instrument calibration variability. Although specific method criteria were not met in this instance, data usability is not impacted and the affected non-detected results are usable as estimated values.

The project goals with respect to sensitivity were met for the volatiles data set with the following exception. All PALs for the groundwater samples were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

The project goals with respect to precision and laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to precision and laboratory data completeness.

# PAH

The project goals with respect to accuracy were met for the PAH data set with the following exception. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were qualified as estimated in sample DSY-SO-SB208-000.5 due to low MS/MSD recoveries; the affected results may be biased low. Although specific method criteria were not met in this instance, the affected positive results are usable as estimated values which may have a minor impact on data usability. In addition, phenanthrene, pyrene, and benzo(g,h,i)perylene were qualified as estimated in sample DSY-SO-SB208-000.5 due to low MS/MSD recoveries. Although specific method criteria were not met in this instance, data usability is not impacted and the affected positive results are usable as estimated values.

The project goals with respect to precision were met for the PAH data set with the following exception. Several compounds were qualified as estimated in samples DSY-SO-SB208-000.5 and DSY-SO-DUP02-0211 due to poor field duplicate precision. Although specific QC criteria were not met in this instance, the affected positive and non-detected results are usable as estimated values which may have a minor impact on data usability. In addition, 2-methylnaphthalene and naphthalene were qualified as estimated in sample DSY-SO-SB208-000.5 due to poor MS/MSD precision. Although specific method

criteria were not met in this instance, data usability is not impacted and the affected positive results are usable as estimated values.

The project goals with respect to sensitivity and laboratory data completeness were met for the PAH data set. Data usability is not impacted with regards to sensitivity and laboratory data completeness.

#### **PCB**

The project goals with respect to accuracy were met for the PCB data set with the following exception. Aroclor-1260 was qualified as estimated in select samples due to analytical interferences detected in the dual column analysis. Although specific method criteria were not met in this instance, the affected positive results are usable as estimated values which may have a minor impact on data usability. In addition, Aroclor-1016 was qualified as estimated in select samples due to poor instrument calibration variability. Sample DSY-SO-SB214-0203 was qualified as estimated due to low surrogate recoveries. Although specific method criteria were not met in these instances, data usability is not impacted and the affected positive and non-detected results are usable as estimated values.

The project goals with respect to precision, sensitivity, and laboratory data completeness were met for the PCB data set. Data usability is not impacted with regards to precision, sensitivity, and laboratory data completeness.

#### **GRO**

The project goals with respect to accuracy were met for the GRO data set. GRO was qualified as estimated in sample DSY-SO-SB214-0203RE due to poor instrument calibration variability. Although specific method criteria were not met in this instance, data usability is not impacted and the affected non-detected results are usable as estimated values.

The project goals with respect to precision, sensitivity, and laboratory data completeness were met for the GRO data set. Data usability is not impacted with regards to precision, sensitivity, and laboratory data completeness.

#### DRO

The project goals with respect to accuracy, precision, sensitivity, and laboratory data completeness were met for the DRO data set. Data usability is not impacted with regards to accuracy, precision, sensitivity, and laboratory data completeness.

Tables:

**Data Summary Tables** 

Data Validation Qualifiers and Codes

Enclosures:

Data Validation Worksheets

# Data Validation Qualifiers and Codes

#### **Data Validation Qualifiers:**

= No qualifier attached to value (positive hit)

J = Value is estimated

= Value is not detected

UJ = Value is not detected and estimated

R = Value (positive hit) is not usable

UR = Value was reported as ND but is not usable

#### **Qualifier Codes:**

A = Lab Blank Contamination

B = Field Blank Contamination

C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)

C01 = GC/MS Tuning Noncompliance

D = MS/MSD Recovery Noncompliance

E = LCS/LCSD Recovery Noncompliance

F = Lab Duplicate Imprecision

G = Field Duplicate Imprecision

H = Holding Time Exceedance

1 = ICP Serial Dilution Noncompliance

J = GFAA PDS - GFAA MSA's r < 0.995

K = ICP Interference - includes ICS % R Noncompliance

L = Instrument Calibration Range Exceedance

M = Sample Preservation Noncompliance

N = Internal Standard Noncompliance

N01 = Internal Standard Recovery Noncompliance Dioxins

N02 = Recovery Standard Noncompliance Dioxins

N03 = Clean-up Standard Noncompliance Dioxins

O = Poor Instrument Performance (e.g. base-line drifting)

P = Uncertainty below quantitation limit (< QL but ≥ MDL)

Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)

R = Surrogates Recovery Noncompliance

S = Pesticide/PCB Resolution

T = % Breakdown Noncompliance for DDT and Endrin

U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC

V = Non-linear calibrations; correlation coefficient r < 0.995

W = EMPC result

X = Signal to noise response drop

Y = Percent solids <30%

Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125	NSAMPLE	DSY-GW-MW	02A-022	2411	DSY-GW-MW	03-0224	11	DSY-GW-TB0	1-02241	1
SDG: CTOWE20_002	LAB_ID	1102285-01		-	1102285-02			1102285-03		***
FRACTION: OV	SAMP_DATE	2/24/2011			2/24/2011			2/24/2011		
MEDIA: WATER	QC_TYPE	NM			NM			ТВ		
	UNITS	UG/L			UG/L		· · · · · · · · · · · · · · · · · · ·	UG/L		-
	PCT_SOLIDS	-								
	DUP_OF								7//	
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHAN	E	0.5	UJ	С	0.5	UJ	С	0.5	UJ	С
1,1,2,2-TETRACHLOROE	THANE	0.5	U		0.5	U		0.5	U	
1,1,2-TRICHLOROETHAN	E	0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHANE		0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHENE		0.5	U		0.5	U		0.5	U	
1,2,4-TRICHLOROBENZE	NE	0.5	U		0.5	U		0.5	U	
1,2-DIBROMO-3-CHLORO	PROPANE	1	U		1	U		1	U	
1,2-DIBROMOETHANE		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROETHANE		0.5	UJ	С	0.5	UJ	С	0.5	UJ	С
1,2-DICHLOROPROPANE		0.5	U		0.5	U		0.5	U	
1,3-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U	
1,4-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U	
2-BUTANONE		5	U		5	U		5	U	
2-HEXANONE		2.5	U		2.5	U		2.5	U	
4-METHYL-2-PENTANON	E	2.5	U		2.5	U		2.5	U	
ACETONE		5	UJ	С	5	UJ	С	5	UJ	С
BENZENE		0.5	U		0.5	U		0.5	U	
BROMODICHLOROMETH	ANE	0.5	UJ	С	0.5	UJ	С	0.5	UJ	С
BROMOFORM		0.5	U		0.5	U		0.5	U	
BROMOMETHANE	-	1	U		1	U		1	U	
CARBON DISULFIDE		0.5	U		0.5	U		0.5	U	
CARBON TETRACHLORII	DE	0.5	UJ	С	0.5	UJ	С	0.5	UJ	С
CHLOROBENZENE		0.5	U		0.5			0.5	U	
CHLORODIBROMOMETH	ANE	0.5	U		0.5	U		0.5	U	
CHLOROETHANE		1	U		1	U		1	U	
CHLOROFORM		0.5			0.5	U		0.5	U	
CHLOROMETHANE		0.5	U		0.5	U		0.5	U	
CIS-1,2-DICHLOROETHE	NE	0.291	J_	Р	0.5	U		0.5		
CIS-1,3-DICHLOROPROP	ENE	0.5	U		0.5	U		0.5	U	1 9
CYCLOHEXANE		0.5			0.5			0.5	U	
DICHLORODIFLUOROME	THANE	1	U		1			1	U	
ETHYLBENZENE		0.5	U		0.5	U		0.5	U	
ISOPROPYLBENZENE		0.5			0.5			0.5		
M+P-XYLENES		1	U		1	Ų		1	U	

PROJ_NO: 02125	NSAMPLE	DSY-GW-MW	02A-022	411	DSY-GW-MW	03-0224	11	DSY-GW-TB0	1-02241	1	
SDG: CTOWE20_002	LAB_ID	1102285-01			1102285-02			1102285-03			
FRACTION: OV	SAMP_DATE	2/24/2011			2/24/2011			2/24/2011			
MEDIA: WATER	QC_TYPE	NM			NM			ТВ			
	UNITS	UG/L			UG/L			UG/L			
	PCT_SOLIDS										
	DUP_OF										
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
METHYL ACETATE		1	U		1	U		1	U		
METHYL CYCLOHEXANE		0.5	U		0.5	U		0.5	U		
METHYL TERT-BUTYL ET	HER	0.5	U		0.5	U		0.5	U		
METHYLENE CHLORIDE		1	U		1	U		1	U		
O-XYLENE		0.5	U		0.5	U		0.5	U		
STYRENE		0.5	U		0.5	U		0.5	U		
TETRACHLOROETHENE		0.5	U		0.696	J	Р	0.5	U		
TOLUENE		0.5	U		0.5	U		0.5	U		
TOTAL XYLENES		1.5	U		1.5	U		1.5	U		
TRANS-1,2-DICHLOROET	HENE	0.5	U		0.5	U		0.5	U		
TRANS-1,3-DICHLOROPR	OPENE	0.5	U		0.5	U		0.5	U		
TRICHLOROETHENE		0.5	U		7.35			0.5	U		
TRICHLOROFLUOROMET	HANE	1	UJ	С	1	UJ	С	1	UJ	С	
VINYL CHLORIDE		0.5	U		0.5	U		0.5	U		

PROJ_NO: 02125	NSAMPLE	DSY-SO-DUP	02-0211		DSY-SO-SB20	.000-80	5	DSY-SO-SB20	9-0.30	7	DSY-SO-SB2	10-0102	<u> </u>		
SDG: CTOWE20_002	LAB_ID	1102288-06			1102288-07			1102288-08			1102288-09				
FRACTION: PAH	SAMP_DATE	2/25/2011			2/25/2011	2/25/2011			2/25/2011			2/25/2011			
MEDIA: SOIL	QC_TYPE	FD			NM			NM	01570		NM				
	UNITS	UG/KG			UG/KG			UG/KG	UG/KG			UG/KG			
	PCT_SOLIDS	83.5			83.3			87.0			85.7				
	DUP_OF	DSY-SO-SB20	8-000.5		0										
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD		
2-METHYLNAPHTHALENE	<b>.</b>	18.8	J	G	33.1	J	DG	299			3.8	U			
ACENAPHTHENE		10	J	GP	36.7	J	G	1000			3.8	U			
ACENAPHTHYLENE		3.94	U		3.97	U		695			5.2	i J	P		
ANTHRACENE		3.94	UJ	G	45.1	J	G	2290			5.8	3 J	Р		
BENZO(A)ANTHRACENE		51.5	J	G	149	J	DG	5740			41.	3			
BENZO(A)PYRENE		46.3	J	G	129	J	DG	4920			26.	3			
BENZO(B)FLUORANTHEN	1E	67.4	J	G	194	J	DG	7120			38.	3			
BENZO(G,H,I)PERYLENE		28.4	J	G	59.5	J	DG	2070			15.	7			
BENZO(K)FLUORANTHEN	1E	28.8	J	G	71.2	J	G	2480	9		16.	1			
CHRYSENE		48.1	J	G	161	J	DG	5650			28.	3			
DIBENZO(A,H)ANTHRACE	NE	10.1	J	P	24.7			820			3.8	3 U			
FLUORANTHENE		103	J	G	350	J	G	13400			61.	2			
FLUORENE		6.3	J	Р	29.5			1220		a • 1	2.2	2 J	P		
INDENO(1,2,3-CD)PYREN	E	23.5	J	G	55.1	J	G	2070			12.	3 J	Р		
NAPHTHALENE	*	14.7	J	P	24.5	J	D	751			2.	5 J	P		
PHENANTHRENE		77.9	J	G	280	J	DG	9530			24.	3			
PYRENE		79.1	J	G	264	J	DG	10100			50.	1			

PROJ_NO: 02125	NSAMPLE	DSY-SO-SB21	1-0102		DSY-SO-SB21	2-0204	***	DSY-SO-SB21	3-0203		DSY-SO-SB21	4-0203		
SDG: CTOWE20_002	LAB_ID	1102288-10		V-1.	1102288-11			1102288-12		-	1102288-13			
FRACTION: PAH	SAMP_DATE	2/25/2011			2/25/2011	2/25/2011			2/25/2011			2/25/2011		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM			
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG			
	PCT_SOLIDS	80.5			94.3		****	84.8			59.1			
	DUP_OF													
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
2-METHYLNAPHTHALENE		8.89	J	Р	3.38	J	Р	3.9	U		281			
ACENAPHTHENE		4.11	U		3.53	U		2.87	J	Р	5.63	U		
ACENAPHTHYLENE		3.5	J	Р	14.2			3.9	U		47.2			
ANTHRACENE		4.11	U		17.2			4.71	J	Р	5.63	U		
BENZO(A)ANTHRACENE		38.1			60.5			32.5			252			
BENZO(A)PYRENE	-	29.9			38.3			18.9			172			
BENZO(B)FLUORANTHEN	IE .	44.4			57.9			26.6			336			
BENZO(G,H,I)PERYLENE		21			20			10.7	J	Р	91.1			
BENZO(K)FLUORANTHEN	IE .	17.5			25.6			11.3	J	Р	124			
CHRYSENE		30.4			44.7			20.5			356			
DIBENZO(A,H)ANTHRACE	NE	7.48	J	Р	7.89	J	Р	3.9	U		43.7			
FLUORANTHENE		39.6			128			43.2			451			
FLUORENE		4.11	U		8.85	J	Р	2.67	J	Р	5.63	U		
INDENO(1,2,3-CD)PYREN	E	18.5			17.4			10.2	J	Р	82.7			
NAPHTHALENE		9.04	J	Р	5.06	J	Р	3.9	U		175			
PHENANTHRENE		25.2			91.3			25.8			400			
PYRENE		35.8			94.2			33.9			375			

PROJ_NO: 02125	NSAMPLE	DSY-SO-DUP	01-0222	11	DSY-SO-DUP	02-0211		DSY-SO-SB20	8-000.5		DSY-SO-SB20	9-0.30.7	7	
SDG: CTOWE20_002	LAB_ID	1102288-01	102288-01 /22/2011 ID IG/KG					1102288-07	1102288-07			1102288-08		
FRACTION: PCB	SAMP_DATE				2/25/2011			2/25/2011			2/25/2011			
MEDIA: SOIL	QC_TYPE				FD			NM			NM			
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG			
	PCT_SOLIDS	94.2			83.5			83.3			87.0			
	DUP_OF	DSY-SO-SB22	24-000.5		DSY-SO-SB20	08-000.5							77.	
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
AROCLOR-1016		17.2	UJ	С	20	UJ	С	19.1	UJ	С	18.9	UJ	С	
AROCLOR-1221		17.2	U		20	U		19.1	U		18.9	U		
AROCLOR-1232		17.2	U		20	U		19.1	U		18.9	U		
AROCLOR-1242		17.2	U		20	U		19.1	U		18.9	U		
AROCLOR-1248		17.2	U		20	U		19.1	U		18.9	U		
AROCLOR-1254		17.2	U		20	U		19.1	U		18.9	U		
AROCLOR-1260		17.2	U		24.2	J	PU	24.7	J	PU	416	J	U	

PROJ_NO: 02125	NSAMPLE	DSY-SO-SB21	DSY-SO-SB210-0102			1-0102		DSY-SO-SB21	DSY-SO-SB212-0204			3-0203		
SDG: CTOWE20_002	LAB_ID	1102288-09	1102288-09			1102288-10			1102288-11			1102288-12		
FRACTION: PCB	SAMP_DATE	2/25/2011			2/25/2011 2			2/25/2011	2/25/2011			2/25/2011		
MEDIA: SOIL	QC_TYPE	NM	NM N			NM			NM			NM		
	UNITS						UG/KG 94.3			UG/KG 84.8				
	PCT_SOLIDS													
÷	DUP_OF													
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
AROCLOR-1016		18.6	UJ	С	20.7	UJ	С	17.2	UJ	С	18.9	U		
AROCLOR-1221		18.6	U		20.7	U		17.2	U		18.9	U		
AROCLOR-1232		18.6	U		20.7	U		17.2	U		18.9	U		
AROCLOR-1242		18.6	U		20.7	U		17.2	U		18.9	U		
AROCLOR-1248		18.6	U		20.7	U		17.2	U		18.9	U		
AROCLOR-1254		18.6	U		20.7	U		17.2	U		18.9	U		
AROCLOR-1260		18.6	U		20.7	U		17.2	U	>	18.9	υ		

PROJ_NO: 02125	NSAMPLE	DSY-SO-SB21	DSY-SO-SB214-0203			15-000.5	5	DSY-SO-SB21	6-000.5	i	DSY-SO-SB217-000.5			
SDG: CTOWE20_002	LAB_ID	1102288-13	1102288-13			1102288-02			1102288-03			1102288-04		
FRACTION: PCB	SAMP_DATE	2/25/2011			2/22/2011			2/22/2011	2/22/2011			2/22/2011		
MEDIA: SOIL	QC_TYPE	NM	MM		NM			NM	NM			NM		
	UNITS						UG/KG			UG/KG				
	PCT_SOLIDS						94.1	94.1			91.6			
	DUP_OF													
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
AROCLOR-1016		26.9	UJ	R	18.1	UJ	С	17.7	UJ <sup>′</sup>	С	17.8	UJ	С	
AROCLOR-1221		26.9	UJ	R	18.1	U		17.7	U		17.8	U		
AROCLOR-1232		26.9	UJ	R	18.1	U		17.7	U		17.8	U		
AROCLOR-1242		26.9	UJ	R	18.1	U		17.7	U		17.8	U		
AROCLOR-1248		26.9	UJ	R	18.1	U		17.7	U		17.8	U		
AROCLOR-1254		26.9	UJ	R	18.1	U		17.7	U		17.8	U		
AROCLOR-1260		26.9	UJ	R	18.1	U		17.7	U		17.8	U		

PROJ_NO: 02125	NSAMPLE	DSY-SO-SB22	4-000.	5			
SDG: CTOWE20_002	LAB_ID	1102288-05					
FRACTION: PCB	SAMP_DATE	2/22/2011					
MEDIA: SOIL	QC_TYPE	NM					
	UNITS	UG/KG					
	PCT_SOLIDS	92.3					
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD			
AROCLOR-1016		17.8	UJ	С			
AROCLOR-1221		17.8	U				
AROCLOR-1232		17.8	U				
AROCLOR-1242		17.8	υ				
AROCLOR-1248		17.8	U				
AROCLOR-1254		17.8	U				
AROCLOR-1260		17.8	υ				

PROJ NO: 02125	NSAMPLE	DSY-SO-DUP	DSY-SO-DUP02-0211			DSY-SO-SB208-000.5			DSY-SO-SB209-0.30.7			DSY-SO-SB210-0102			
SDG: CTOWE20_002	LAB_ID	1102288-06	1102288-06			1102288-07			1102288-08			1102288-09			
FRACTION: PET	SAMP_DATE	2/25/2011	2/25/2011 2/			2/25/2011			2/25/2011			2/25/2011			
MEDIA: SOIL	QC_TYPE	FD	D N			NM			NM			NM			
	UNITS	MG/KG	MG/KG			MG/KG			MG/KG			MG/KG			
	PCT_SOLIDS	83.5					83.3		87	87.0			85.7		
	DUP_OF	DSY-SO-SB20	8-000.5												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD		
DIESEL RANGE ORGANICS		35.5			44.8			366			37.6				
GASOLINE RANGE ORGANICS		4.82	J	Р	2.83	J	Р	3.74	U		4.37	U			

PROJ_NO: 02125	NSAMPLE	DSY-SO-SB21	DSY-SO-SB211-0102			DSY-SO-SB212-0204				DSY-SO-SB213-0203			RE	
SDG: CTOWE20_002	LAB_ID	1102288-10	1102288-10			1102288-11			1102288-12			1102288-13RE1		
FRACTION: PET	SAMP_DATE	2/25/2011	2/25/2011			2/25/2011			2/25/2011			2/25/2011		
MEDIA: SOIL	QC_TYPE	NM	NM N			NM N			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG			
	PCT_SOLIDS	80.5			94.3		1	84.8			59.1			
	DUP_OF				16									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
DIESEL RANGE ORGANICS		48.2			17.8			25						
GASOLINE RANGE ORGA	ORGANICS		U		4.39	U		3.43	U	1	6.9	UJ	С	

PROJ_NO: 02125	NSAMPLE	DSY-SO-TB02-022511						
SDG: CTOWE20_002	LAB_ID	1102288-14						
FRACTION: PET	SAMP_DATE	2/25/2011						
MEDIA: SOIL	QC_TYPE	ТВ						
	UNITS	MG/KG						
	PCT_SOLIDS							
	DUP_OF							
PARAMETER		RESULT	VQL	QLCD				
DIESEL RANGE ORGAN	ICS							
GASOLINE RANGE ORG	SANICS	5	U					



TETRA TECH NUS, INC. RECORD OF REVIEW

TITLE AS IT APPEARS ON THE DOCUMENT – (See instruction #1 on reverse for definition of Documents):

I. III LE AS II APPEARS ON THE DOCUMENT								
DV Memo to T. Campbell, CTOWE NEWPORT, NEWPORT, RHODE IS	20, ON S SLAND	SHORE D	ERECKT	OR SHIF	YARD, S	SITE 19, N	IAVAL S	TATION
Tier II Organic Data Validation, S	DG CTO	WE20_00	3					
2. DATE OF DOCUMENT: 4/18/11		D	OCUMENT	CONTROL	10.: C- NO	204-04	-11- 42	293W
AUTHORS: J. Cardinal		Tt	NUS JOB C	HARGE No.:	112G02	125 - SA.	.DV	
TYPE (DRAFT, DRAFT FINAL, FINAL): Fir	nal	SI	JBMITTAL C	ATE:				
3. REVIEWER AND STATUS REVIEW	ERS ASSI	GNED BY:			Date			
Assigned Reviewer	Disap	proval		ed with stions		Requires rification	Approved By	
(See Instruction #3)	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) Luy Guzmas							Af	1/8/11
b)							7	
c)								
d)				***************************************				
4. COMMENTS (Explain conditions and comments	s, or state wh	ere comment	s and edits a	re provided.	Attach additie	onal pages as	needed):	
5. AUTHOR COMMENTS/RESOLUTION:								
6. APPROVAL FOR TRANSMITTAL:								
					DATE:_			-
See #7 on Reverse for Authority to Approve Transi	mittals							
				·				



# **TETRA TECH NUS, INC**

# **INTERNAL CORRESPONDENCE**

C-NAVY-04-11-4293W

Date:

April 18, 2011

c: File G02125-4.10 (w/enc.-original)

To:

T. Campbell (w/o enc.)

From:

J. Cardinal (no copy)

Subject:

Tier II Organic Data Validation, SDG CTOWE20 003

Empirical Laboratories, LLC

CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,

NAVSTA Newport, Newport, Rhode Island

VOC:

5/Groundwaters/

DSY-GW-DUP01-0211

DSY-GW-MW11A-022611 DSY-GW-MW221-030211

DSY-GW-MW220-030111

DSY-GW-MW222-030211

(Field Duplicate Pair: DSY-GW-MW11A-022611/DSY-GW-DUP01-0211)

1/Trip Blank/

DSY-GW-TB01-030111

VOC/PAH:

2/Groundwaters/

DSY-GW-MW08-030111

DSY-GW-MW218-030111

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compounds (VOC) and polycyclic aromatic hydrocarbons (PAH) analytical data for the samples in this SDG. The samples were collected at the On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI from February 26 – March 2, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to USEPA SW-846 Method 8260B. The PAH analysis was performed according to USEPA SW-846 Method 8270C.

The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs). The data user should consider the most recent revisions to the applicable regulatory limits. The VOC and PAH data validation was performed in accordance with the Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- Preservation and Technical Holding Times
- GC/MS Instrument Performance Check (Tuning)

- Initial and Continuing Calibrations
  - Blanks
- Surrogate Compounds
  - Internal Standards
    - Matrix Spike/Matrix Spike Duplicate
  - Laboratory Control Sample/Laboratory Control Sample Duplicate
- Field Duplicates
  - Limits of Detection
    - \* All criteria were met for this parameter.

# **Laboratory Data Completeness**

Sample ID DSY-GW-TB01-030111 has the suffix "-030111", however, the sample date for this sample is February 26, 2011 per the chain-of-custody form. No further action was taken.

### **Volatiles**

On April 12, 2011 the laboratory resubmitted the preparation bench sheets for the volatile samples to show that the pH of the samples was  $\leq 2$  since this was not provided in the original data package.

## **Blanks**

### PAH

The following table summarizes the level of blank contamination detected in the method blank associated with the samples.

Compound	Type of Blank	Maximum Conc. (μg/L)	Action Level (µg/L)	Affected Sample
Benzo(a)anthracene	Method	0.215	1.075	DSY-GW-MW218-030111

Blank action was applied to the affected groundwater sample due to benzo(a)anthracene method blank contamination. The 5x rule applies for this compound. Positive results below the blank action levels were changed to non-detected values (U) at the sample results.

Although benzo(a)anthracene contamination were found in the method blank, the project sensitivity goals are not impacted since there are no PALs established for benzo(a)anthracene for the groundwater samples. The benzo(a)anthracene result in the affected sample is usable as a non-detected value.

## Matrix Spike/Matrix Spike Duplicate

## **Volatiles**

The following table summarizes the results of the matrix spike and/or matrix spike duplicate (MS/MSD) analysis of sample DSY-GW-MW08-030111 that were outside of the QC limit:

Analyto	RPD	RPD	Д	ction
Analyte	NED	QC Limit	(+)	NDs
Chloroethane	32.7	30		UJ

Although the MS/MSD relative percent difference for chloroethane did not meet the QC limit; the project precision goals are not impacted since the affected sample result is more than an order of magnitude below the PAL. The non-detected chloroethane result in sample DSY-GW-MW08-030111 is usable as an estimated value for which the bias is indeterminate.

## **Limits of Detection**

All non-detected results were reported at the limit of detection (LOD). Positive results above the detection limit (DL) and below the limit of quantitation (LOQ) were qualified as estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

There are no PALs established for the trip blank sample.

### **Volatiles**

All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

### PAH

All PALs were met by the LODs.

Benzo(a)anthracene in sample DSY-GW-MW218-030111 was changed to a non-detected value due to blank contamination. As discussed above in the Blanks section, data usability is not impacted.

## **Analytical Data Usability Assessment**

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

## **Volatiles**

The project goals with respect to precision were met for the volatiles data set. Chloroethane was qualified as estimated in sample DSY-GW-MW08-030111 due to poor MS/MSD precision. Although specific method criteria were not met in this instance, data usability is not impacted and the affected non-detected result is usable as an estimated value.

The project goals with respect to sensitivity were met for the volatiles data set with the following exception. All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

The project goals with respect to accuracy and laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to accuracy and laboratory data completeness.

## PAH

The project goals with respect to accuracy, precision, sensitivity, and laboratory data completeness were met for the PAH data set. Data usability is not impacted with regards to accuracy, precision, sensitivity, and laboratory data completeness.

Tables:

Data Summary Tables

Data Validation Qualifiers and Codes

Enclosures:

Data Validation Worksheets

# Data Validation Qualifiers and Codes

### **Data Validation Qualifiers:**

= No qualifier attached to value (positive hit)

J = Value is estimated

U = Value is not detected

UJ = Value is not detected and estimated

R = Value (positive hit) is not usable

UR = Value was reported as ND but is not usable

### **Qualifier Codes:**

A = Lab Blank Contamination

B = Field Blank Contamination

C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)

C01 = GC/MS Tuning Noncompliance

D = MS/MSD Recovery Noncompliance

E = LCS/LCSD Recovery Noncompliance

F = Lab Duplicate Imprecision

G = Field Duplicate Imprecision

H = Holding Time Exceedance

1 = ICP Serial Dilution Noncompliance

J = GFAA PDS - GFAA MSA's r < 0.995

K = ICP Interference - includes ICS % R Noncompliance

L = Instrument Calibration Range Exceedance

M = Sample Preservation Noncompliance

N = Internal Standard Noncompliance

N01 = Internal Standard Recovery Noncompliance Dioxins

N02 = Recovery Standard Noncompliance Dioxins

N03 = Clean-up Standard Noncompliance Dioxins

O = Poor Instrument Performance (e.g. base-line drifting)

P = Uncertainty below quantitation limit (< QL but ≥ MDL)

Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)

R = Surrogates Recovery Noncompliance

S = Pesticide/PCB Resolution

T = % Breakdown Noncompliance for DDT and Endrin

U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC

V = Non-linear calibrations; correlation coefficient r < 0.995

W = EMPC result

X = Signal to noise response drop

Y = Percent solids <30%

Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125	NSAMPLE	DSY-GW-D	JP01-021	1	DSY-GW-MW	/08-030	111	DSY-GW-MW	11A-02	2611	DSY-GW-MW	218-03	D111	
SDG: CTOWE20_003	LAB_ID	1103052-01			1103052-04			1103052-02			1103052-06			
FRACTION: OV	SAMP_DATE	2/26/2011			3/1/2011			2/26/2011		***************************************	3/1/2011			
MEDIA: WATER	QC_TYPE	FD			NM		***************************************	NM			NM			
	UNITS	UG/L			UG/L	UG/L			UG/L			UG/L		
	PCT_SOLIDS										***			
	DUP_OF	DSY-GW-M	W11A-02	2611				***************************************						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
1,1,1-TRICHLOROETHANE		0	.5 U		0.5	5 U		0.5	U		0.5	U		
1,1,2,2-TETRACHLOROET	HANE	0	.5 U		0.5	5 U		0.5	U		0.5	U		
1,1,2-TRICHLOROETHANE	<b>=</b>	. 0	.5 U		0.5	5 U		0.5	U		0.5	~		
1,1-DICHLOROETHANE		0	.5 U		0.5	i U		0.5	U		0.5	U		
1,1-DICHLOROETHENE		0	.5 U		0.25	5 J	Р	0.5	U		0.5	U		
1,2,4-TRICHLOROBENZEN	1E	0	.5 U		0.5	i U		0.5	U		0.5			
1,2-DIBROMO-3-CHLORO	PROPANÉ		1 U		1	U		1	U			U		
1,2-DIBROMOETHANE		0	.5 U		0.5	U		0.5	U		0.5	U		
1,2-DICHLOROBENZENE		0	.5 U		0.5	U		0.5	U		0.5	U		
1,2-DICHLOROETHANE		0	.5 U		0.5	i U		0.5	U		0.5	U		
1,2-DICHLOROPROPANE		0	.5 U		0.5	U		0.5	U		0.5	U		
1,3-DICHLOROBENZENE		0	.5 U		0.5	i U		0.5	U		0.5	U		
1,4-DICHLOROBENZENE		0	.5 U		0.5	U	***************************************	0.5	U		0.5	U		
2-BUTANONE			5 U		5	U		5	U		5	U		
2-HEXANONE		2	.5 U		2.5	U		2.5	U		2.5	U		
4-METHYL-2-PENTANONE		2	.5 U		2.5	i U		2.5	U		2.5	U		
ACETONE			5 U		5	U		5	U		5	U		
BENZENE		0	.5 U		0.5	i U		0.5	U		0.5	U		
BROMODICHLOROMETHA	NE	0	.5 U		0.5	U		0.5	U		0.5	U		
BROMOFORM		0	.5 U		0.5	U		0.5	U		0.5	U		
BROMOMETHANE			1 U		1	U		1	U		1	U		
CARBON DISULFIDE		0	.5 U		0.5	U		0.5	U		0.5	U		
CARBON TETRACHLORID	E	0	.5 U		0.5	U		0.5	U		0.5	U		
CHLOROBENZENE		0	5 U		0.5	U		0.5	U		0.5	U		
CHLORODIBROMOMETHA	\NE	0	5 U		0.5	U		0.5	U		0.5	U		
CHLOROETHANE			1 U		1	UJ	D	1	U		1	U		
CHLOROFORM		0	5 U		0.5	U		0.5	U		0.5	U		
CHLOROMETHANE		0	5 U		0.5	U		0.5	U		0.5	U		
CIS-1,2-DICHLOROETHEN	E	0.36		Р	12.7			0.284	J	Р	0.5	U		
CIS-1,3-DICHLOROPROPE	NE		5 U			U		0.5	U		0.5	U		
CYCLOHEXANE		0	5 U		0.5			0.5			0.5			
DICHLORODIFLUOROMET	THANE		1 U		1	U		1	U		1	U		
ETHYLBENZENE			5 U		0.5			0.5	U		0.5	U		
ISOPROPYLBENZENE		J	5 U		0.5			0.5			0.5			
M+P-XYLENES			1 U		1	U		1	U		1	U		

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PROJ_NO: 02125	NSAMPLE	DSY-GW-MW2	DSY-GW-MW220-030111			221-03	0211	DSY-GW-M	W222-03	30211	DSY-TB01-03	0111	
SDG: CTOWE20_003	LAB_ID	1103052-08			1103052-09			1103052-10		***************************************	1103052-03		
FRACTION: OV	SAMP_DATE	3/1/2011			3/2/2011			3/2/2011			2/26/2011		
MEDIA: WATER	QC_TYPE	NM			NM			NM		***************************************	ТВ		
	UNITS	UG/L			UG/L			UG/L		*	UG/L		
	PCT_SOLIDS									***************************************			
	DUP_OF									*****			
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHAN	ΙE	0.5	U		0.5	U		0	.5 U		0.5	U	
1,1,2,2-TETRACHLOROE	THANE	0.5	U		0.5	U		0	.5 U		0.5		
1,1,2-TRICHLOROETHAN	IE .	0.5	U		0.5	U		0	.5 U		***	U	
1,1-DICHLOROETHANE		0.5	U		0.5	U		0	.5 U			U	
1,1-DICHLOROETHENE		0.5	U		0.5	U		0	.5 U	***************************************	0.5		
1,2,4-TRICHLOROBENZE	NE	0.5	U		0.5	U		C	.5 U		0.5		
1,2-DIBROMO-3-CHLORO	PROPANE	1	U		***************************************	U			1 U		1		
1,2-DIBROMOETHANE		0.5	U		0.5	U			.5 U		0.5	U	
1,2-DICHLOROBENZENE		0.5	U		0.5	U			.5 U		0.5	-{	
1,2-DICHLOROETHANE		0.5	U		0.5	U			.5 U		0.5		
1,2-DICHLOROPROPANE	-	0.5	U		0.5	U			.5 U		0.5		
1,3-DICHLOROBENZENE		0.5	U		0.5	U			.5 U		0.5	-{	
1,4-DICHLOROBENZENE		0.5	U		0.5	U			.5 U		0.5		***
2-BUTANONE		5	U			U			5 U			U	
2-HEXANONE		2.5	U		2.5	U		2	.5 U		2.5		
4-METHYL-2-PENTANON	E	2.5	U		2.5				.5 U		2.5	·	
ACETONE	WWW.	5	U			U			5 U			U	
BENZENE		0.5	U		0.5	.3		0	.5 U		0.5		
BROMODICHLOROMETH	IANE	0.5	U		0.5				.5 U		0.5	<del></del>	
BROMOFORM		0.5	U		0.5				.5 U		0.5		
BROMOMETHANE		1	U			U			1 U			U	
CARBON DISULFIDE		0.5	U		0.5	U		0	.5 U		0.5	U	
CARBON TETRACHLORII	DE	0.5	U		0.5				.5 U		0.5		
CHLOROBENZENE		0.5	U		0.5	U			.5 U		0.5		
CHLORODIBROMOMETH	ANE	0.5	U		0.5	U		0	.5 U		0.5	U	
CHLOROETHANE	,	1	U			U			1 U			U	
CHLOROFORM		0.5	U		0.5	U		0	.5 U		0.5	U	
CHLOROMETHANE		0.5	U		0.5	U		0	.5 U		0.5	U	
CIS-1,2-DICHLOROETHE	NE	4.26			1.49				.5 U		0.5		
CIS-1,3-DICHLOROPROP	ENE	0.5	U	**************************************	0.5	U		0	.5 U		0.5		
CYCLOHEXANE		0.5	U	***************************************	0.5				.5 U		0.5		
DICHLORODIFLUOROME	THANE	1	U			U			1 U			U	
ETHYLBENZENE		0.5	U		0.5	U		0	.5 U		0.5	U	
ISOPROPYLBENZENE		0.5			0.5	U			.5 U		0.5	<u> </u>	
M+P-XYLENES		1	U		1	U			1 U		1	U	

2 of 4 4/18/2011

PROJ_NO: 02125	NSAMPLE	DSY-GW-DUF	01-021	1	DSY-GW-MW	08-030	111	DSY-GW-MW	11A-02	2611	DSY-GW-M	N218-03	)111
SDG: CTOWE20_003	LAB_ID	1103052-01			1103052-04	••		1103052-02	· · · · · · · · · · · · · · · · · · ·	···	1103052-06		
FRACTION: OV	SAMP_DATE	2/26/2011			3/1/2011		***************************************	2/26/2011	*****	10.000	3/1/2011		
MEDIA: WATER	QC_TYPE	FD			NM			NM			NM		
	UNITS	UG/L			UG/L	UG/L			***************************************		UG/L		
	PCT_SOLIDS												
	DUP_OF	DSY-GW-MW	11A-022	2611							***************************************		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		1	U		1	U		1	U			1 U	
METHYL CYCLOHEXANE		0.5	U		0.5	U		0.5	U		0	5 U	
METHYL TERT-BUTYL ET	HER	0.5	U		0.5	U		0.5	U			.5 U	
METHYLENE CHLORIDE		1	U		1	U		1	U			1 U	
O-XYLENE		0.5	U		0.5	U		0.5	U		0	5 U	
STYRENE		0.5	U		0.5	U		0.5	U			5 U	
TETRACHLOROETHENE		0.5	U		0.5	U		0.5	U			5 U	
TOLUENE		0.5	U		0.5	U		0.5	U			5 U	
TOTAL XYLENES		1.5	Ü		1.5	U		1.5	U			5 U	
TRANS-1,2-DICHLOROET	HENE	0.683	J	Р	0.5	U		0.669	J	Р		5 U	
TRANS-1,3-DICHLOROPR	OPENE	0.5	U		0.5	U		0.5	U			5 U	
TRICHLOROETHENE		4.97			3.9			5.15				5 U	
TRICHLOROFLUOROMET	HANE	1	U		0.581	J	Р	1	U			1 U	
VINYL CHLORIDE		0.5	U		0.263	J	Р	0.5	U		0.	5 U	

PROJ_NO: 02125	NSAMPLE	DSY-GW-MW	220-030	)111	DSY-GW-MW	221-03	0211	DSY-GW-M\	V222-03	0211	DSY-TB01-0	30111		
SDG: CTOWE20_003	LAB_ID	1103052-08			1103052-09			1103052-10			1103052-03	1103052-03		
FRACTION: OV	SAMP_DATE	3/1/2011			3/2/2011			3/2/2011	3/2/2011			2/26/2011		
MEDIA: WATER	QC_TYPE	NM			NM	NM			NM			ТВ		
I	UNITS	UG/L			UG/L			UG/L			UG/L			
	PCT_SOLIDS												***************************************	
	DUP_OF			200710										
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
METHYL ACETATE		1	υ		1	U	***************************************	***************************************	1 U			1 U		
METHYL CYCLOHEXANE		0.5	υ		0.5	U		0.	5 U		0.	5 U		
METHYL TERT-BUTYL ET	HER	0.5	U		0.5	U		0.	5 U	****	0.	5 U		
METHYLENE CHLORIDE		1	U		1	U			1 U			1 U		
O-XYLENE		0.5	U		0.5	U		0.	5 U		0.	5 U		
STYRENE		0.5	U		0.5	U		0.	5 U		0.	5 U		
TETRACHLOROETHENE		0.5	U		0.5	U		0.	5 U		0.	5 U		
TOLUENE		0.5	U		0.5	U		0.	5 U		0.	5 U		
TOTAL XYLENES		1.5	U		1.5	U		1.	5 U		1.	5 U		
TRANS-1,2-DICHLOROET	HENE	1.1			0.5	U		0.	5 U		0.	5 U		
TRANS-1,3-DICHLOROPF	ROPENE	0.5	U		0.5	U		0.	5 U		0.	5 U		
TRICHLOROETHENE		0.5	U		12.2			5.4	В		0.	5 U		
TRICHLOROFLUOROMET	ΓHANE	1	U		1	U			1 U			1 U		
VINYL CHLORIDE		1.47			0.5	U		0.	5 U		0.	5 U		

PROJ_NO: 02125	NSAMPLE	DSY-GW-MW	00 0201	11	DSY-GW-MW218-030111				
			08-0301	11		218-030	111		
SDG: CTOWE20_003	LAB_ID	1103052-04			1103052-06	14			
FRACTION: PAH	SAMP_DATE	3/1/2011			3/1/2011				
MEDIA: WATER	QC_TYPE	NM			NM				
	UNITS	UG/L			UG/L				
	PCT_SOLIDS								
	DUP_OF								
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD		
2-METHYLNAPHTHALEN	E	0.0926	U		0.0943	U			
ACENAPHTHENE		0.0926	U		0.0943	U			
ACENAPHTHYLENE		0.0926	U		0.0943	U			
ANTHRACENE		0.0926	U		0.0943	U			
BENZO(A)ANTHRACENE		0.0926	U		0.221	U	Α		
BENZO(A)PYRENE		0.0926	U		0.0943	U			
BENZO(B)FLUORANTHEI	NE	0.0926	U		0.0943	U			
BENZO(G,H,I)PERYLENE		0.0926	U		0.0943	U			
BENZO(K)FLUORANTHEI	NE	0.0926	U		0.0943	U			
CHRYSENE		0.0926	U		0.0943	U			
DIBENZO(A,H)ANTHRAC	ENE	0.0926	U		0.0943	U			
FLUORANTHENE		0.0926	U		0.0943	U			
FLUORENE		0.0926	U		0.0943	U			
INDENO(1,2,3-CD)PYREN	0.0926	U		0.0943	U				
NAPHTHALENE	0.0926	U		0.0943	U				
PHENANTHRENE	0.0926	U		0.0943	U				
PYRENE		0.0926	υ		0.0943	U			



# TETRA TECH NUS, INC.

# **RECORD OF REVIEW**

1. TITLE AS IT APPEARS ON THE DOCUMENT - (See instruction #1 on reverse for definition of Documents):

DV Memo to T. Campbell, CTOWE20, ON SHORE DERECKTOR SHIPYARD, SITE 19, NAVAL STATION NEWPORT, NEWPORT, RHODE ISLAND

Tier II Organic Data Validation, S	DG CTO	WE20_00	)4					
2. DATE OF DOCUMENT: 4/18/41  AUTHORS: J. Cardinal  TYPE (DRAFT, DRAFT FINAL, FINAL): FI	nal	т		HARGE No.:	112G02			295 W
3. REVIEWER AND STATUS REVIEW	VERS ASSI	GNED BY:			Date			
Assigned Reviewer	Disap	proval		ed with estions	Reviewer Final Ve	Requires rification	Appro	ved By
(See Instruction #3)	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) Lucy Guzman							A	4/19/20
b)							1	
c)								
d)								
4. COMMENTS (Explain conditions and commen	ts, or state wh	ere commen	ts and edits a	re provided.	Attach addition	onal pages as	s needed):	
5. AUTHOR COMMENTS/RESOLUTION:								
6. APPROVAL FOR TRANSMITTAL:								
San #7 an Davierra for Authority to Approve Trans	mittale				DATE:		**************************************	***************************************
See #7 on Reverse for Authority to Approve Trans	smittals							



# **TETRA TECH NUS, INC**

# INTERNAL CORRESPONDENCE

C-NAVY-04-11-4295W

Date:

April 18, 2011

c: File G02125-4.10 (w/enc.-original)

To:

T. Campbell (w/o enc.)

From:

J. Cardinal (no copy)

Subject:

Tier II Organic Data Validation, SDG CTOWE20\_004

Empirical Laboratories, LLC

CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,

NAVSTA Newport, Newport, Rhode Island

VOC:

1/Groundwater/

DSY-GW-MW12-030311

VOC/GRO:

1/Trip Blank/

DSY-GW-TB01-030311

VOC/PAH/DRO/GRO/PCB:

1/Rinsate Blank/

DSY-SO-RB01-0311

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), diesel range organic (DRO; C8-C40), and gasoline range organic (GRO; C6-C10) analytical data for the samples in this SDG. The samples were collected at the On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI from March 3-8, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to USEPA SW-846 Method 8260B. The PAH analysis was performed according to USEPA SW-846 Method 8270C. The PCB analysis was performed according to USEPA SW-846 Method 8082A. The DRO and GRO analyses were performed according to USEPA SW-846 Method 8015B.

The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs). The data user should consider the most recent revisions to the applicable regulatory limits. The VOC, PAH, GRO, and DRO data validation was performed in accordance with the <a href="Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses">Region I EPA-NE Data Validation Functional Guidelines for Evaluating Organic Analyses</a>, Part III, February 2004.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

Laboratory Data Completeness

- Preservation and Technical Holding Times
  - GC/MS Instrument Performance Check (Tuning)
  - Initial and Continuing Calibrations
  - Blanks
- Surrogate Compounds
  - Internal Standards
- NA Matrix Spike/Matrix Spike Duplicate
- Laboratory Control Sample/Laboratory Control Sample Duplicate
- NA Field Duplicates
  - Analyte Identification/Quantitation
  - Limits of Detection
    - \* All criteria were met for this parameter. NA Not applicable for this SDG.

# **Laboratory Data Completeness**

Although trip blank sample ID DSY-GW-TB01-030311 has the suffix "-030311", the sample was collected on March 8, 2011 according to the chain-of-custody form. This trip blank is associated with the groundwater sample collected on March 3, 2011. No further action was taken.

On April 6, 2011 the laboratory resubmitted all of the Analysis Data Sheets (Form 1s) for all samples for all fractions in this SDG to correct the sample dates of the samples since the sample dates were incorrect in the original data package.

## GRO

On April 18, 2011 the laboratory resubmitted the GRO logbook pages to show that pH was <2 for all GRO samples since the pH of the samples was not included in the original data package.

## **Initial and Continuing Calibrations**

## **Volatiles**

The following table summarizes the volatile compounds that failed to meet the continuing calibration (CC) criterion of %D <25:

Compound	%D	Ac	tion	Affected Comples
Compound	70D	(+)	NDs	Affected Samples
Carbon tetrachloride	32.4		UJ	
Cyclohexane	29.5		UJ	Alloomaloo
cis-1,3-Dichloropropene	28.2		UJ	All samples
Methylcyclohexane	28.4		UJ	

Although the %D was outside of the QC limit for carbon tetrachloride, cyclohexane, cis-1,3-dichloropropene, and methylcyclohexane; the project accuracy goals are not impacted since the affected groundwater sample results are more than an order of magnitude below the PAL and there are no regulatory limits established for the rinsate and trip blank samples. The non-detected carbon tetrachloride,

cyclohexane, cis-1,3-dichloropropene, and methylcyclohexane results in the affected samples are usable as estimated values.

### PAH

The following table summarizes the PAH compounds that failed to meet the continuing calibration (CC) criterion of %D <20:

Compound	0/ D	Action	Affacted Comple
Compound	%D	(+) NDs	Affected Sample
Benzo(a)anthracene	-25.5	UJ	DSY-SO-RB01-0311

Although the %D was outside of the QC limit for benzo(a)anthracene; the project accuracy goals are not impacted since there are no regulatory limits established for the rinsate blank sample. The non-detected benzo(a)anthracene result in the affected sample is usable as an estimated value.

## **Limits of Detection**

All non-detected results were reported at the limit of detection (LOD). Positive results above the detection limit (DL) and below the limit of quantitation (LOQ) were qualified as estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

There are no PALs established for the rinsate and trip blank samples.

## **Volatiles**

All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater sample.

## **Analytical Data Usability Assessment**

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

### Volatiles

The project goals with respect to accuracy were met for the volatiles data set. Carbon tetrachloride, cyclohexane, cis-1,3-dichloropropene, and methylcyclohexane were qualified as estimated in select samples due to poor instrument calibration variability. Although specific method criteria were not met in this instance, data usability is not impacted and the affected non-detected results are usable as estimated values.

The project goals with respect to precision could not be fully evaluated for the volatiles data set since no precision-based QC was analyzed for the volatiles analysis in this SDG.

The project goals with respect to sensitivity were met for the volatiles data set with the following exception. All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater sample.

The project goals with respect to laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to laboratory data completeness.

### PAH/PCB/GRO/DRO

The PAH, PCB, GRO, and DRO data sets was not assessed for data usability since there are no quality control indicators established for the rinsate and trip blank samples.

Tables:

**Data Summary Tables** 

Data Validation Qualifiers and Codes

Enclosures:

Data Validation Worksheets

# Data Validation Qualifiers and Codes

### **Data Validation Qualifiers:**

= No qualifier attached to value (positive hit)

J = Value is estimated

U = Value is not detected

UJ = Value is not detected and estimated

R = Value (positive hit) is not usable

UR = Value was reported as ND but is not usable

### **Qualifier Codes:**

A = Lab Blank Contamination

B = Field Blank Contamination

C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)

C01 = GC/MS Tuning Noncompliance

D = MS/MSD Recovery Noncompliance

E = LCS/LCSD Recovery Noncompliance

F = Lab Duplicate Imprecision

G = Field Duplicate Imprecision

H = Holding Time Exceedance

I = ICP Serial Dilution Noncompliance

J = GFAA PDS - GFAA MSA's r < 0.995

K = ICP Interference - includes ICS % R Noncompliance

L = Instrument Calibration Range Exceedance

M = Sample Preservation Noncompliance

N = Internal Standard Noncompliance

N01 = Internal Standard Recovery Noncompliance Dioxins

N02 = Recovery Standard Noncompliance Dioxins

N03 = Clean-up Standard Noncompliance Dioxins

O = Poor Instrument Performance (e.g. base-line drifting)

P = Uncertainty below quantitation limit (< QL but ≥ MDL)

Q = Other problems (can encompass a number of issues; e.g. chromatography, interferences, etc.)

R = Surrogates Recovery Noncompliance

S = Pesticide/PCB Resolution

T = % Breakdown Noncompliance for DDT and Endrin

U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC

V = Non-linear calibrations; correlation coefficient r < 0.995

W = EMPC result

X = Signal to noise response drop

Y = Percent solids <30%

Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125	NSAMPLE	DSY-GW-MW	12-0303	11	DSY-SO-RB0	1-0311		DYS-GW-TB01-030311			
SDG: CTOWE20_004	LAB_ID	1103107-01			1103107-02			1103107-03			
FRACTION: OV	SAMP_DATE	3/3/2011			3/8/2011			3/8/2011			
MEDIA: WATER	QC_TYPE	NM			RB			ТВ			
	UNITS	UG/L			UG/L	*		UG/L			
	PCT_SOLIDS					***************************************					
	DUP_OF										
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
1,1,1-TRICHLOROETHANE		0.5	U		0.5	U		0.5	U		
1,1,2,2-TETRACHLOROET	HANE	0.5	U		0.5	U		0.5	U		
1,1,2-TRICHLOROETHANE		0.5	U		0.5	U		0.5	U		
1,1-DICHLOROETHANE		0.5	U		0.5	U		0.5	U		
1,1-DICHLOROETHENE		0.5	U		0.5	U		0.5	U		
1,2,4-TRICHLOROBENZEN	۱E	0.5	U		0.5	U		0.5	U		
1,2-DIBROMO-3-CHLORO	PROPANE	1	U		1	U		1	U		
1,2-DIBROMOETHANE		0.5	U		0.5	U		0.5	U		
1,2-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		
1,2-DICHLOROETHANE		0.5	U		0.5	U		0.5	U		
1,2-DICHLOROPROPANE		0.5	U		0.5	U		0.5	U		
1,3-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		
1,4-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		
2-BUTANONE		5	U		18.1			5	U		
2-HEXANONE		2.5	U		2.5	U		2.5	U		
4-METHYL-2-PENTANONE		2.5	U		2.5	U		2.5	U		
ACETONE		5	U		5.36	J	Р	5	U		
BENZENE		0.5	U		0.5	U		0.5	U		
BROMODICHLOROMETHA	NE	0.5	U		0.5	U		0.5	U		
BROMOFORM		0.5	U		0.5	U		0.5	U		
BROMOMETHANE		1	U		1	U		1	U		
CARBON DISULFIDE		0.5	U		0.5	U		0.5	U		
CARBON TETRACHLORID	E	0.5	UJ	С	0.5	UJ	С	0.5	UJ	С	
CHLOROBENZENE		0.5	U		0.5	U		0.5			
CHLORODIBROMOMETHA	ANE	0.5			0.5	U		0.5	U		
CHLOROETHANE		1	U		1	U		1	U		
CHLOROFORM		0.5	U		0.595	J	Р	0.5	U		
CHLOROMETHANE		0.5	U		0.5	U		0.5	I		
CIS-1,2-DICHLOROETHEN	IE	3.73			0.5			0.5			
CIS-1,3-DICHLOROPROPE	ENE	0.5		С		UJ	С	0.5		С	
CYCLOHEXANE		0.5		С		UJ	С		UJ	С	
DICHLORODIFLUOROMET	THANE		U		_	U			U		
ETHYLBENZENE		0.5			0.5	<del></del>		0.5			
ISOPROPYLBENZENE		0.5			0.5			0.5			
M+P-XYLENES		1	U		1	U		1	U		

1 of 2

PROJ_NO: 02125	NSAMPLE	DSY-GW-MW	12-0303	11	DSY-SO-RB0	1-0311		DYS-GW-TB01-030311		
SDG: CTOWE20_004	LAB_ID	1103107-01			1103107-02			1103107-03		
FRACTION: OV	SAMP_DATE	3/3/2011			3/8/2011			3/8/2011		
MEDIA: WATER	QC_TYPE	NM	NM					TB		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS									
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		1	U		1	U		1	U	
METHYL CYCLOHEXANE		0.5	UJ	С	0.5	UJ	С	0.5	UJ	С
METHYL TERT-BUTYL ET	THER	0.5	U		0.5	U		0.5	U	
METHYLENE CHLORIDE	1000000	1	U		1	U		1	U	
O-XYLENE		0.5	U		0.5	U		0.5	U	
STYRENE		0.5	U		0.5	U		0.5	U	
TETRACHLOROETHENE		0.5	U		0.5	U		0.5	U	
TOLUENE		0.5	U		0.5	U		0.5	U	
TOTAL XYLENES		1.5	U		1.5	U		1.5	U	
TRANS-1,2-DICHLOROET	THENE	4.81			0.5	U		0.5	U	
TRANS-1,3-DICHLOROPF	ROPENE	0.5	U		0.5	U		0.5	U	
TRICHLOROETHENE		9.61			0.5	U		0.5	U	
TRICHLOROFLUOROME	THANE	1	U		1	U		1	U	
VINYL CHLORIDE		0.5	U		0.5	U		0.5	U	

NSAMPLE	DSY-SO-RB01	DSY-SO-RB01-0311					
LAB_ID	1103107-02						
SAMP_DATE	3/8/2011						
QC_TYPE	RB						
UNITS	UG/L						
PCT_SOLIDS							
DUP_OF							
	RESULT	VQL	QLCD				
	0.0943	U					
	0.0943	U					
	0.0943	U					
	0.0943	U					
	0.0943	UJ	С				
	0.0943	U					
E	0.0943	U					
	0.0943	U					
E	0.0943	U					
	0.0943	U					
NE	0.0943	U					
3.11,0,000	0.0943	U					
	0.0943	U					
<b>E</b>	0.0943	U					
	0.0789	J	Р				
	0.0943	U					
	0.0943	U					
	LAB_ID SAMP_DATE QC_TYPE UNITS PCT_SOLIDS DUP_OF	LAB_ID 1103107-02 SAMP_DATE 3/8/2011 QC_TYPE RB UNITS UG/L PCT_SOLIDS DUP_OF  RESULT  0.0943 0.0943 0.0943 0.0943 E 0.0943 E 0.0943 NE 0.0943 NE 0.0943 E 0.0943 SIE 0.0943	LAB_ID 1103107-02  SAMP_DATE 3/8/2011  QC_TYPE RB  UNITS UG/L  PCT_SOLIDS  DUP_OF  RESULT VQL  0.0943 U  0.0943 U  0.0943 U  0.0943 U  0.0943 U  0.0943 U  E 0.0943 U  E 0.0943 U  E 0.0943 U  NE 0.0943 U  NE 0.0943 U				

PROJ_NO: 02125	NSAMPLE	DSY-SO-RB01	-0311				
SDG: CTOWE20_004	LAB_ID	1103107-02					
FRACTION: PCB	RACTION: PCB SAMP_DATE			,			
MEDIA: WATER	QC_TYPE	RB					
	UNITS	UG/L					
	PCT_SOLIDS						
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD			
AROCLOR-1016		0.236	U				
AROCLOR-1221		0.236	U				
AROCLOR-1232		0.236	U				
AROCLOR-1242		0.236	U				
AROCLOR-1248		0.236	U				
AROCLOR-1254		0.236	U				
AROCLOR-1260		0.236	U				

PROJ_NO: 02125	NSAMPLE	DSY-SO-RB0	1-0311		DYS-GW-TB0	1-03031	11		
SDG: CTOWE20_004	LAB_ID	1103107-02			1103107-03	1103107-03			
FRACTION: PET	SAMP_DATE	3/8/2011			3/8/2011				
MEDIA: WATER	QC_TYPE	RB			ТВ				
	UNITS	MG/L			MG/L				
	PCT_SOLIDS								
	DUP_OF								
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD		
DIESEL RANGE ORGANIC	S	0.0935	U						
GASOLINE RANGE ORGA	GASOLINE RANGE ORGANICS				0.1	U			



# TETRA TECH NUS, INC.

# **RECORD OF REVIEW**

1. TITLE AS IT APPEARS ON THE DOCUMENT – (See instruction #1 on reverse for definition of Documents):

DV Memo to T. Campbell, CTOWE20, On-Shore Derecktor Shipyard, Site 19, Naval Station Newport, Newport, Rhode Island

Tier II Organic Data Validation, S	DG CTO	WE20_00	5							
2. DATE OF DOCUMENT: 5/3/1/ AUTHORS: J. Cardinal			OCCUMENT CONTROL No.: (- Nary - 05 - 11 - 4 3 27 W							
TYPE (DRAFT, DRAFT FINAL, FINAL): FI	nal	s	UBMITTAL C	ATE:						
3. REVIEWER AND STATUS REVIEW	VERS ASSI	GNED BY:			Date					
Assigned Reviewer	Disap	proval	Approv Sugge	ed with stions	Reviewer Requires Final Verification		Appro	ved By		
(See Instruction #3) Initials (Date) Initials (Date) Initials (Date) Initials										
Luy German							H	5/3/11		
(b)							y			
c)										
d)										
4. COMMENTS (Explain conditions and commen	ls, or state wh	iere commeni	s and edits a	re provided.	Attach addition	onal pages as	s needed):			
5. AUTHOR COMMENTS/RESOLUTION:				7						
JF						V				
6. APPROVAL FOR TRANSMITTAL:	¥	56.								
					DATE:					
See #7 on Reverse for Authority to Approve Tran	smittals									



# **TETRA TECH NUS, INC**

# INTERNAL CORRESPONDENCE

C-NAVY-04-11-4327W

Date:

May 03, 2011

c: File G02125-4.10 (w/enc.-original)

To:

T. Campbell (w/o enc.)

From:

J. Cardinal (no copy)

Subject:

Tier II Organic Data Validation, SDG CTOWE20 005

Empirical Laboratories, LLC

CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,

NAVSTA Newport, Newport, Rhode Island

VOC:

1/Groundwater/

DSY-GW-MW223-031611

1/Trip Blank/

DSY-GW-TB01-031611

VOC/PAH:

3/Groundwaters/

DSY-GW-DUP02-031611

DSY-GW-MW204-031711

DSY-GW-MW219-031611

(Field Duplicate Pair: DSY-GW-MW219-031611/DSY-GW-DUP02-031611)

1/Rinsate Blank/

DSY-GW-RB01-031611

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compounds (VOC) and polycyclic aromatic hydrocarbons (PAH) analytical data for the samples in this SDG. The samples were collected at the On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI from March 16-17, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to USEPA SW-846 Method 8260B. The PAH analysis was performed according to USEPA SW-846 Method 8270C.

The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs). The data user should consider the most recent revisions to the applicable regulatory limits. The VOC and PAH data validation was performed in accordance with the Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- Preservation and Technical Holding Times

Memo to T. Campbell May 03, 2011 Page 2

- GC/MS Instrument Performance Check (Tuning)
  - Initial and Continuing Calibrations
  - Blanks
  - Surrogate Compounds
- Internal Standards
- NA
- Matrix Spike/Matrix Spike Duplicate
- Laboratory Control Sample/Laboratory Control Sample Duplicate
- Field Duplicates
  - Limits of Detection
    - \* All criteria were met for this parameter. NA Not applicable for this SDG.

# **Laboratory Data Completeness**

The laboratory mistakenly logged in sample DSY-GW-MW204-**031711** with the suffix "-031611" and the sample date 3/16/11 (actual sample date is 3/17/11). On April 25, 2011 the laboratory resubmitted all affected forms to correct the sample ID and sample date.

### **Volatiles**

On April 19, 2011 the laboratory resubmitted the VOC logbook pages to show that the pH was <2 for all VOC samples since this information was not included in the original data package.

# **Initial and Continuing Calibrations**

### **Volatiles**

The following table summarizes the volatile compounds that failed to meet the continuing calibration (CC) criterion of %D <25:

Compound	0/ D	Ac	tion	Affastad Camples
Compound	%D	(+)	NDs	Affected Samples
Chloroethane	26.7		UJ	All samples
Dichlorodifluoromethane	46.7		UJ	All samples

Although the %D was outside of the QC limit for chloroethane and dichlorodifluoromethane, the project accuracy goals are not impacted since there are no project action limits established for these compounds for the samples in this SDG. The non-detected chloroethane and dichlorodifluoromethane results in the affected samples are usable as estimated values.

## **Limits of Detection**

All non-detected results were reported at the limit of detection (LOD). Positive results above the detection limit (DL) and below the limit of quantitation (LOQ) were qualified as estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

There are no PALs established for the rinsate and trip blank samples.

Memo to T. Campbell May 03, 2011 Page 3

## **Volatiles**

All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

## **PAHs**

All the PALs were met by the LOD values.

# **Analytical Data Usability Assessment**

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

### **Volatiles**

The project goals with respect to accuracy were met for the volatiles data set. Chloroethane and dichlorodifluoromethane were qualified as estimated in select samples due to poor instrument calibration variability. Although specific method criteria were not met in this instance, data usability is not impacted and the affected non-detected results are usable as estimated values.

The project goals with respect to sensitivity were met for the volatiles data set with the following exception. All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

The project goals with respect to precision and laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to precision and laboratory data completeness.

# **PAH**

The project goals with respect to accuracy, precision, sensitivity, and laboratory data completeness were met for the PAH data set. Data usability is not impacted with regards to accuracy, precision, sensitivity, and laboratory data completeness.

Tables:

Data Summary Tables

Data Validation Qualifiers and Codes

**Enclosures:** 

**Data Validation Worksheets** 

# Data Validation Qualifiers and Codes

### **Data Validation Qualifiers:**

= No qualifier attached to value (positive hit)

J = Value is estimated

U = Value is not detected

UJ = Value is not detected and estimated

R = Value (positive hit) is not usable

UR = Value was reported as ND but is not usable

### **Qualifier Codes:**

A = Lab Blank Contamination

B = Field Blank Contamination

C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)

C01 = GC/MS Tuning Noncompliance

D = MS/MSD Recovery Noncompliance

E = LCS/LCSD Recovery Noncompliance

F = Lab Duplicate Imprecision

G = Field Duplicate Imprecision

H = Holding Time Exceedance

I = ICP Serial Dilution Noncompliance

J = GFAA PDS - GFAA MSA's r < 0.995

K = ICP Interference - includes ICS % R Noncompliance

L = Instrument Calibration Range Exceedance

M = Sample Preservation Noncompliance

N = Internal Standard Noncompliance

N01 = Internal Standard Recovery Noncompliance Dioxins

N02 = Recovery Standard Noncompliance Dioxins

N03 = Clean-up Standard Noncompliance Dioxins

O = Poor Instrument Performance (e.g. base-line drifting)

P = Uncertainty below quantitation limit (< QL but ≥ MDL)

Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)

R = Surrogates Recovery Noncompliance

S = Pesticide/PCB Resolution

T = % Breakdown Noncompliance for DDT and Endrin

U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC

V = Non-linear calibrations; correlation coefficient r < 0.995

W = EMPC result

X = Signal to noise response drop

Y = Percent solids <30%

Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125	NSAMPLE	DSY-GW-DU	P02-031	611	DSY-GW-MW	204-031	711	DSY-GW-MW	219-031	611	DSY-GW-MW	/223-031	611
SDG: CTOWE20_005	LAB_ID	1103179-01			1103179-09		-(a-	1103179-03	The state of the s		1103179-07		
FRACTION: OV	SAMP_DATE	3/16/2011			3/17/2011	3/17/2011					3/16/2011		
MEDIA: WATER	QC_TYPE	FD			NM			NM			NM		
	UNITS	UG/L			UG/L	UG/L UG/L					UG/L		
	PCT_SOLIDS			-						A Company			
	DUP_OF	DSY-GW-MW	/219-03	1611		***		1					
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHAN	E	0.5	U		0.5	U		0.5	U		0.5	5 U	
1,1,2,2-TETRACHLOROE	THANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2-TRICHLOROETHAN	E	0.5	U		0.5	U		0.5	U	-	0.5	5 U	
1,1-DICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	υ	
1,1-DICHLOROETHENE		0.5	U		0.5	U		0.5	U		0.5	5 U	
1,2,4-TRICHLOROBENZE	NE	0.5	U		0.5	U		0.5	U		0.5	5 U	
1,2-DIBROMO-3-CHLORO	PROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE		0.5	U		0.5	U		0.5	U		0.5	5 U	
1,2-DICHLOROBENZENE		0.5	5 U		0.5	U		0.5	U		0.5	5 U	
1,2-DICHLOROETHANE	· · · · · · · · · · · · · · · · · · ·	0.5	U		0.5	U		0.5	U		0.5	5 U	
1,2-DICHLOROPROPANE		0.5	U		0.5	U		0.5	+		0.5	υ	
1,3-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	υ	
1,4-DICHLOROBENZENE		0.5	U		0.5			0.5	U			5 U	
2-BUTANONE		5	U		5	U		5	U			U	
2-HEXANONE		2.5	U		2.5	U		2.5	U		2.5	U	
4-METHYL-2-PENTANONI	E	2.5	i U		2.5	U		2.5	U		2.5	5 U	
ACETONE		3.28	3 J	Р	5	U		5	U			U	
BENZENE		0.5	U		0.5	U		0.5	U		0.5	i U	
BROMODICHLOROMETH	ANE	0.5	U		0.5	U		0.5	U		0.5	i U	
BROMOFORM		0.5	U		0.5	U		0.5	U		0.5	i U	
BROMOMETHANE		1	U		1	U		1	U		1	U	
CARBON DISULFIDE		0.5	U		0.5	U		0.5	U		0.5	5 U	
CARBON TETRACHLORIE	DE	0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	5 U	
CHLORODIBROMOMETH	ANE	0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROETHANE	1 4	1	UJ	С	1	UJ	С	1	UJ	С	1	UJ	С
CHLOROFORM		0.5	U		0.5	U		0.5	U		0.5	5 U	
CHLOROMETHANE		0.5	U		0.5	U		0.5	U		0.5	5 U	
CIS-1,2-DICHLOROETHEI	NE	0.5	U		0.5	U		0.5	U		0.5	5 U	
CIS-1,3-DICHLOROPROP	ENE	0.5	U		0.5			0.5	U			5 U	
CYCLOHEXANE		0.5	U		0.5	U			U			i U	
DICHLORODIFLUOROME	THANE	1	UJ	С	1	UJ	С	1	UJ	С		UJ	С
ETHYLBENZENE		0.5	U		0.5	U		0.5	U			5 U	
ISOPROPYLBENZENE			U		0.5			0.5				U	
M+P-XYLENES		1	U		1	U		1	U		1	U	

PROJ_NO: 02125	NSAMPLE	DSY-GW-RB0	1-03161	1	DSY-GW-TB0	1-03161	11			
SDG: CTOWE20_005	LAB_ID	1103179-05			1103179-08	M.	1000			
FRACTION: OV	SAMP_DATE	3/16/2011			3/16/2011					
MEDIA: WATER	QC_TYPE	RB			ТВ	ТВ				
	UNITS				UG/L					
	PCT_SOLIDS		***							
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD			
1,1,1-TRICHLOROETHANE	<b>E</b>	0.5	U		0.5	U				
1,1,2,2-TETRACHLOROET	HANE	0.5	U		0.5	U				
1,1,2-TRICHLOROETHANE	<b>=</b>	0.5	U		0.5	U				
1,1-DICHLOROETHANE	1000 0	0.5	U		0.5	U				
1,1-DICHLOROETHENE		0.5	U		0.5	U				
1,2,4-TRICHLOROBENZEN	NE	0.5	U		0.5	U				
1,2-DIBROMO-3-CHLORO	PROPANE	1	U			U				
1,2-DIBROMOETHANE		0.5	U	1	0.5	U				
1,2-DICHLOROBENZENE		0.5	U		0.5	U				
1,2-DICHLOROETHANE		0.5	U		0.5	U				
1,2-DICHLOROPROPANE		0.5	U		0.5	U				
1,3-DICHLOROBENZENE	DICHLOROBENZENE		U		0.5	U				
1,4-DICHLOROBENZENE	DICHLOROBENZENE				0.5	U				
2-BUTANONE		18.3			5	U				
2-HEXANONE		2.5	U		2.5	U				
4-METHYL-2-PENTANONE		2.5	U		2.5	U				
ACETONE		6.12	J	Р	5	U				
BENZENE		0.5	U		0.5	U				
BROMODICHLOROMETHA	ANE	0.5	U		0.5	U				
BROMOFORM		0.5	U		0.5	U				
BROMOMETHANE		1	U		1	U				
CARBON DISULFIDE		0.5	U		0.5	U				
CARBON TETRACHLORIC	E	0.5	U		0.5	U				
CHLOROBENZENE		0.5	U		0.5	U				
CHLORODIBROMOMETHA	ANE	0.5	U		0.5	U				
CHLOROETHANE	170	1	UJ	С		UJ	С			
CHLOROFORM		0.411	J	Р	0.5	U				
CHLOROMETHANE		0.5			0.5					
CIS-1,2-DICHLOROETHEN		0.5			0.5					
CIS-1,3-DICHLOROPROPE	ENE	0.5			0.5					
CYCLOHEXANE		0.5			0.5					
	CHLORODIFLUOROMETHANE		UJ	С		UJ	С			
ETHYLBENZENE	THYLBENZENE		U		0.5					
ISOPROPYLBENZENE		0.5			0.5					
M+P-XYLENES		1	U		1	U				

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5/3/2011

PROJ_NO: 02125	NSAMPLE	DSY-GW-DUP	02-031	611	DSY-GW-MW	204-031	1711	DSY-GW-MW	219-03	611	DSY-GW-MV	<b>V223-03</b> 1	1611
SDG: CTOWE20_005	LAB_ID	1103179-01			1103179-09			1103179-03			1103179-07		
FRACTION: OV	SAMP_DATE	3/16/2011			3/17/2011			3/16/2011			3/16/2011		
MEDIA: WATER	QC_TYPE	FD	FD				Academia	NM		11.741-4	NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF	DSY-GW-MW2	219-031	611									-2
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		1	U		1	U		1	υ			υ	
METHYL CYCLOHEXANE		0.5	U		0.5	υ		0.5	υ		0.5	5 U	
METHYL TERT-BUTYL ET	THER	0.5	U		0.5	U		0.5	U		0.5	5 U	
METHYLENE CHLORIDE		1	U		1	U		1	U		1	U	
O-XYLENE		0.5	U		0.5	U		0.5	U		0.5	5 U	
STYRENE		0.5	U		0.5	υ		0.5	U		0.5	5 U	
TETRACHLOROETHENE		0.5	U		0.5	υ		0.5	U		0.5	5 U	
TOLUENE		0.5	U		0.5	υ		0.5	U		0.8	5 U	
TOTAL XYLENES		1.5	U		1.5	υ		1.5	U		1.5	5 U	
TRANS-1,2-DICHLOROET	THENE	0.5	U		0.5	U		0.5	U		0.8	5 U	
TRANS-1,3-DICHLOROPF	ROPENE	0.5	U		0.5	U		0.5	U		0.5	5 U	
TRICHLOROETHENE		0.5	U		3.16			0.5	U		0.5	5 U	
TRICHLOROFLUOROME	THANE	1	U		1	U		1	υ			ΙU	
VINYL CHLORIDE		0.5	U		0.5	U		0.5	U		0.5	5 U	

PROJ_NO: 02125	NSAMPLE	DSY-GW-RB0	1-03161	11	DSY-GW-TB0	W-TB01-031611			
SDG: CTOWE20_005	LAB_ID	1103179-05			1103179-08				
FRACTION: OV	SAMP_DATE	3/16/2011			3/16/2011	······································			
MEDIA: WATER	QC_TYPE	RB			ТВ				
	UNITS	UG/L		2	UG/L				
	PCT_SOLIDS			7,5			-		
	DUP_OF		,						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD		
METHYL ACETATE		1	U		1	U			
METHYL CYCLOHEXANE		0.5	U		0.5	U			
METHYL TERT-BUTYL ETH	ETHYL TERT-BUTYL ETHER				0.5	U			
METHYLENE CHLORIDE		1	U		1	U			
O-XYLENE		0.5	U		0.5	U			
STYRENE		0.5	U		0.5	U			
TETRACHLOROETHENE		0.5	U		0.5	U			
TOLUENE		0.5	U		0.5	U			
TOTAL XYLENES	OTAL XYLENES				1.5	U			
TRANS-1,2-DICHLOROETH	RANS-1,2-DICHLOROETHENE				0.5	U			
TRANS-1,3-DICHLOROPRO	RANS-1,3-DICHLOROPROPENE				0.5	U			
TRICHLOROETHENE	RICHLOROETHENE				0.5	U			
TRICHLOROFLUOROMETI	RICHLOROFLUOROMETHANE				1	U			
VINYL CHLORIDE		0.5	U		0.5	U			

PROJ_NO: 02125	NSAMPLE	DSY-GW-DUF	02-031	511	DSY-GW-MW	204-03	1711	DSY-GW-MW	219-03	1611	DSY-GW-RB0	1-0316	11
SDG: CTOWE20_005	LAB_ID	1103179-01			1103179-09			1103179-03		110			
FRACTION: PAH	SAMP_DATE	3/16/2011			3/17/2011			3/16/2011			3/16/2011		
MEDIA: WATER	QC_TYPE	FD		NM			NM			RB			
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS										- 37		
	DUP_OF	DSY-GW-MW	219-031	611									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALEN	E	0.0943	U		0.0962	U		0.0943	U		0.0962	U	
ACENAPHTHENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
ACENAPHTHYLENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
ANTHRACENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
BENZO(A)ANTHRACENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
BENZO(A)PYRENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
BENZO(B)FLUORANTHE	NE	0.0943	U		0.0962	U		0.0943	U		0.0962	U	
BENZO(G,H,I)PERYLENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
BENZO(K)FLUORANTHE	NE	0.0943	U		0.0962	U		0.0943	U		0.0962	U	
CHRYSENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
DIBENZO(A,H)ANTHRAC	ENE	0.0943	U		0.0962	U		0.0943	U		0.0962	U	
FLUORANTHENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
FLUORENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
INDENO(1,2,3-CD)PYREN	ΙE	0.0943	U		0.0962	U		0.0943	U		0.0962	U	
NAPHTHALENE		0.0943	U		0.0962	U		0.0943	U		0.0724		P
PHENANTHRENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
PYRENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	



# TETRA TECH NUS, INC.

# **RECORD OF REVIEW**

1. TITLE AS IT APPEARS ON THE DOCUMENT – (See instruction #1 on reverse for definition of Documents):

DV Memo to T. Campbell, CTOWE20, ON SHORE DERECKTOR SHIPYARD, SITE 19, NAVAL STATION NEWPORT, NEWPORT, RHODE ISLAND

Tier II Organic Data Validation, S	DG CTO	WE20_00	)1					
2. DATE OF DOCUMENT: 4/4/ // AUTHORS: J. Cardinal	nal	T	INUS JOB CI	HARGE No.:	112G02			4568 M
TYPE (DRAFT, DRAFT FINAL, FINAL): FI	id!		UBMITTAL D	)ATE:				
3. REVIEWER AND STATUS REVIEW	ERS ASSI	GNED BY:			Date			
Assigned Reviewer	Disap	proval	Approv Sugge	ed with stions	Reviewer Final Ve	Requires rification	Appro	ved By
(See Instruction #3)	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
Luy Guzman	7						#	4/5/11
b)							1/	
c)								
d)			_					
4. COMMENTS (Explain conditions and comment	s, of state wh	ere comment	s and edits a	re provided.	Attach addition	onal pages as	needed):	
18								
5. AUTHOR COMMENTS/RESOLUTION:								
								•
6. APPROVAL FOR TRANSMITTAL:								
					DATE:_			_
See #7 on Reverse for Authority to Approve Trans	mittals							



# **TETRA TECH NUS, INC**

# INTERNAL CORRESPONDENCE

C-NAVY-04-11-4268W

Date:

April 04, 2011

c: File G02025-4.10 (w/enc.-original)

To:

T. Campbell (w/o enc.)

From:

J. Cardinal (no copy)

Subject:

Tier II Organic Data Validation, SDG CTOWE20\_001

Empirical Laboratories, LLC

CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,

NAVSTA Newport, Newport, Rhode Island

VOC/PAH/DRO/GRO:

9/Soils/

DSY-SB204-SO-0002 DS DSY-SB205-SO-0002 DS

DSY-SB204-SO-0810 DSY-SB205-SO-088.5 DSY-SB206-SO-0810

DSY-SB206-SO-0002 DSY-SB207-SO-0002

DSY-SB207-SO-1012

DSY-SO-DUP01-021411

(Field Duplicate Pair: DSY-SB204-SO-0002/DSY-SO-DUP01-021411)

VOC/GRO:

1/Trip Blank/

DSY-SO-TB01-021111

PAH:

2/Soils/

DSY-SB201-SO-0204

DSY-SB202-SO-0204

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAH), diesel range organic (DRO; C8-C40), and gasoline range organic (GRO; C6-C10) analytical data for the samples in this SDG. The samples were collected at the On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI from February 9-15, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to USEPA SW-846 Method 8260B. The PAH analysis was performed according to USEPA SW-846 Method 8270C. The DRO and GRO analyses were performed according to USEPA SW-846 Method 8015B.

The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs) listed in Table A-2. The data user should consider the most recent revisions to the applicable regulatory limits. The VOC, PAH, DRO, and GRO data validation was performed in accordance with the <u>Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses</u>, December 1996.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- Preservation and Technical Holding Times
- GC/MS Instrument Performance Check (Tuning)
- Initial and Continuing Calibrations
- Blanks
- Surrogate Compounds
- Internal Standards
  - Matrix Spike/Matrix Spike Duplicate
- Laboratory Control Sample/Laboratory Control Sample Duplicate
  - Field Duplicates
  - Percent Solids
    - Limits of Detection
      - \* All criteria were met for this parameter.

# **Laboratory Data Completeness**

### **Volatiles**

On March 17, 2011 the laboratory clarified that DoD limits were applied for the LCS/LCSD and surrogates for the volatiles analysis.

### PAH

Select samples were analyzed at dilution only. On March 17, 2011 the laboratory clarified that samples were diluted due to matrix interferences. These samples were not analyzed at lower dilution. No further action was taken.

On March 17, 2011 the laboratory clarified that the low-level PAH LCS/LCSD and surrogate limits applied are from AFCEE 4.02 as DoD does not address low-level PAHs by Method 8270 as indicated in proposal note 10. No further action was taken.

### DRO

For the DRO samples the limit of quantitation (LOQ) is equal to the detection limit (DL) and limit of detection (LOD). On March 17, 2011 the laboratory clarified that no results are reported less than the LOQ for DRO. No further action was taken.

# **Initial and Continuing Calibrations**

### **Volatiles**

The following table summarizes the volatile compound that failed to meet the initial calibration verification criterion of %D <20%:

Compound	%D	9/ D Action		Affected Samples
Compound	70D	(+)	NDs	Affected Samples
Dichlorodifluoromethane	40.7		UJ	All samples

Although initial calibration verification %D for dichlorodifluoromethane was above the QC limit, the project accuracy goals are not impacted since the affected sample results are more than an order of magnitude below the PAL. The non-detected dichlorodifluoromethane results in the affected samples are usable as estimated values.

The following table summarizes the volatile compounds that failed to meet the continuing calibration (CC) criterion of %D <20 for CCCs or <25% for the other compounds:

Compound	%D	Action		Affected Comples
		(+)	NDs	Affected Samples
Acetone	-25.4	J	UJ	All samples except DSY-SB207-SO-0002 and DSY-SO-TB01-021111
Bromoform	25.6		UJ	DSY-SO-TB01-021111
1,2-Dibromo-3- chloropropane	27.3,		IJ	DSY-SB207-SO-0002
Bromomethane	99.6		UJ	
2-Butanone	27.6		UJ	DSY-SO-TB01-021111
2-Hexanone	30.3		UJ	
Methyl acetate	25.6	J		*

Although the %D was outside of the QC limit for acetone, bromoform, 1,2-dibromo-3-chloropropane, bromomethane, 2-butanone, 2-hexanone, and methyl acetate; the project accuracy goals are not impacted since the affected sample results are below the PAL and there are no regulatory limits established for the trip blank sample. The positive and non-detected acetone, bromoform, 1,2-dibromo-3-chloropropane, bromomethane, 2-butanone, 2-hexanone, and methyl acetate results in the affected samples are usable as estimated values.

### **PAH**

The following table summarizes the PAH compound that failed to meet the continuing calibration (CC) criterion of %D <25:

Compound	%D	Action		Affected Complete
		(+)	NDs	Affected Samples
Benzo(a)anthracene	33.7	J	UJ	All samples

The %D was outside of the QC limit for benzo(a)anthracene; therefore, the project accuracy goals may be impacted. The positive and non-detected benzo(a)anthracene results in the affected samples are usable as estimated values.

## **Blanks**

### **Volatiles**

The following table summarizes the level of blank contamination detected in the trip blank associated with the samples.

Compound	Type of Blank	Maximum Conc. (μg/Kg)	Action Level (μg/Kg)	Affected Samples
Methylene chloride	Trip	8.6	86	All samples except DSY-SO-TB01-021111

Blank actions were applied to the affected soil samples due to methylene chloride trip blank contamination. The 10x rule applies for methylene chloride. Positive results below the blank action levels were changed to non-detected values (U) at the sample results.

Although methylene chloride contamination were found in the trip blank, the project sensitivity goals are not impacted since the non-detected values do not exceed the project action limit for methylene chloride. The methylene chloride results in the affected soil samples are usable as non-detected values.

# **Limits of Detection**

The VOC, GRO, and PAH non-detected results were reported at the limit of detection (LOD). Positive results above the detection limit (DL) and below the limit of quantitation (LOQ) were qualified as estimated (J) due to uncertainty below the LOQ. The non-detected results for are reported at the LOQ. Project action limits (PALs) were evaluated for non-detected results only.

There are no PALs established for the trip blank sample.

### **Volatiles**

All PALs were met by the LODs.

Results for methylene chloride in select samples were changed to non-detected values due to blank contamination. As discussed above in the Blanks section, data usability is not impacted.

### PAH

Samples DSY-SB204-SO-0002, DSY-SB205-SO-0002, DSY-SB207-SO-0002, and DSY-SO-DUP01-021411 were analyzed at 5x dilution.

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All PALs were met by the LODs except for dibenzo(a,h)anthracene and benzo(a)pyrene. Data usability may be impacted for these compounds for the soil samples.

### **DRO**

The PAL was met by the LOQs.

### GRO

The PAL was met by the LODs.

### Analytical Data Usability Assessment

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

### **Volatiles**

The project goals with respect to accuracy were met for the volatiles data set. Dichlorodifluoromethane was qualified as estimated in select samples due to poor initial calibration verification performance. Acetone, bromoform, 1,2-dibromo-3-chloropropane, bromomethane, 2-butanone, 2-hexanone, and methyl acetate were qualified as estimated in select samples due to instrument calibration variability. Although specific method criteria were not met in these instances, data usability is not impacted and the affected positive and non-detected results are usable as estimated values.

The project goals with respect to precision, sensitivity, and laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to precision, sensitivity, and laboratory data completeness.

### PAH

The project goals with respect to accuracy were met for the PAH data set with the following exception. Benzo(a)anthracene was qualified as estimated in all samples due to instrument calibration variability. Although specific method criteria were not met in this instance, the affected positive and non-detected results are usable as estimated values which may have a minor impact on data usability.

The project goals with respect to sensitivity were met for the PAH data set with the following exception. All PALs were met by the LODs except for dibenzo(a,h)anthracene and benzo(a)pyrene. Data usability may be impacted for these compounds for the soil samples.

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The project goals with respect to precision and laboratory data completeness were met for the PAH data set. Data usability is not impacted with regards to precision and laboratory data completeness.

### **DRO and GRO**

The project goals with respect to accuracy, precision, sensitivity, and laboratory data completeness were met for the DRO and GRO data set. Data usability is not impacted with regards to accuracy, precision, sensitivity, and laboratory data completeness.

Tables:

**Data Summary Tables** 

Data Validation Qualifiers and Codes

**Enclosures:** 

**Data Validation Worksheets** 

### Data Validation Qualifiers and Codes

### **Data Validation Qualifiers:**

= No qualifier attached to value (positive hit)

J = Value is estimated

U = Value is not detected

UJ = Value is not detected and estimated

R = Value (positive hit) is not usable

UR = Value was reported as ND but is not usable

### **Qualifier Codes:**

A = Lab Blank Contamination

B = Field Blank Contamination

C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)

C01 = GC/MS Tuning Noncompliance

D = MS/MSD Recovery Noncompliance

E = LCS/LCSD Recovery Noncompliance

F = Lab Duplicate Imprecision

G = Field Duplicate Imprecision

H = Holding Time Exceedance

I = ICP Serial Dilution Noncompliance

J = GFAA PDS - GFAA MSA's r < 0.995

K = ICP Interference - includes ICS % R Noncompliance

L = Instrument Calibration Range Exceedance

M = Sample Preservation Noncompliance

N = Internal Standard Noncompliance

N01 = Internal Standard Recovery Noncompliance Dioxins

N02 = Recovery Standard Noncompliance Dioxins

N03 = Clean-up Standard Noncompliance Dioxins

O = Poor Instrument Performance (e.g. base-line drifting)

P = Uncertainty below quantitation limit (< QL but ≥ MDL)

Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)

R = Surrogates Recovery Noncompliance

S = Pesticide/PCB Resolution

T = % Breakdown Noncompliance for DDT and Endrin

U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC

V = Non-linear calibrations; correlation coefficient r < 0.995

W = EMPC result

X = Signal to noise response drop

Y = Percent solids <30%

Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125	NSAMPLE	DSY-SB204-S	O-0002		DSY-SB204-S	O-0810		DSY-SB205-S	O-0002	115	DSY-SB205	-SO-088	5
SDG: CTOWE20_001	LAB_ID	1102160-05			1102160-03			1102160-09			1102160-10		
FRACTION: OV	SAMP_DATE	2/14/2011			2/11/2011			2/15/2011			2/15/2011		16 + 6
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		*(.).
	PCT_SOLIDS	91.5		***	93.5			85.7			93.3	1985	
	DUP_OF	å		and the same of th			***						776
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE	-	2.76	U		2.65	U		2.72	U		2.1	18 U	
1,1,2,2-TETRACHLOROET	HANE	2.76	U		2.65	U		2.72	U			18 U	
1,1,2-TRICHLOROETHANE		2.76	U		2.65	U		2.72	U			18 U	
1,1-DICHLOROETHANE		2.76	U		2.65	U		2.72	U		2.1	18 U	***
1,1-DICHLOROETHENE		2.76	U		2.65	U		2.72	U		2.1	18 U	
1,2,4-TRICHLOROBENZEN	IE .	2.76	U		2.65	U		2.72	U		2.1	18 U	
1,2-DIBROMO-3-CHLORO	PROPANE	5.52	U		5.3	U		5.43	U	1		36 U	
1,2-DIBROMOETHANE		2.76	U		2.65	U		2.72	U		2.1	18 U	
1,2-DICHLOROBENZENE		2.76	U		2.65	U		2.72	U		2.1	18 U	
1,2-DICHLOROETHANE		2.76	U		2.65	U		2.72	U		2.1	18 U	
1,2-DICHLOROPROPANE		2.76	U		2.65	U		2.72	U		2.1	18 U	
1,3-DICHLOROBENZENE		2.76	U		2.65	U		2.72	U		2.1	18 U	
1,4-DICHLOROBENZENE		2.76	U		2.65	U		2.72	U		2.1	18 U	
2-BUTANONE		5.52	U		5.3	U		5.43	U		4.3	36 U	
2-HEXANONE		2.76	U		2.65	U		2.72	U		2.1	18 U	
4-METHYL-2-PENTANONE		2.76	U		2.65	U		2.72	U		2.1	18 U	
ACETONE		11	UJ	С	10.6	UJ	C	27.3	J	С	8.7	73 UJ	С
BENZENE		2.76	U		2.65	U		2.72	U		2.1	18 U	
BROMODICHLOROMETHA	NE	2.76	U		2.65	U		2.72	U		2.1	18 U	
BROMOFORM		2.76	U		2.65	U		2.72	U		2.1	18 U	
BROMOMETHANE		5.52	U		5.3	U		5.43	U		4.3	36 U	
CARBON DISULFIDE		2.76	U		2.65	U		3.28	J	Р	2	.6 J	Р
CARBON TETRACHLORID	E	2.76	Ū		2.65	U		2.72	U		2.1	18 U	
CHLOROBENZENE		2.76	U		2.65	U		2.72	U		2.1	18 U	
CHLORODIBROMOMETHA	NE	2.76	U		2.65	U		2.72	U		2.1	18 U	
CHLOROETHANE		5.52	U		5.3	U		5.43	U		4.3	36 U	
CHLOROFORM		2.76	U		2.65			2.72	U			18 U	
CHLOROMETHANE		5.52	U		5.3		e.	5.43				36 U	
CIS-1,2-DICHLOROETHEN		2.76	+		2.65			2.72				18 U	
CIS-1,3-DICHLOROPROPE	NE	2.76			2.65			2.72				18 U	
CYCLOHEXANE		2.76	-		2.65			2.72				18 U	
DICHLORODIFLUOROMET	THANE	5.52	_	С	5.3	_	С	5.43		С		86 UJ	С
ETHYLBENZENE		2.76			2.65			2.72				8 U	
ISOPROPYLBENZENE		2.76			2.65			2.72				8 U	
M+P-XYLENES		5.52	U		2.8	J	Р	5.43	U		4.3	86 U	

PROJ_NO: 02125	NSAMPLE	DSY-SB206-S	SY-SB206-SO-0002			O-0810		DSY-SB207-S	0-0002		DSY-SB207-S	O-1012	
SDG: CTOWE20_001	LAB_ID	1102160-06			1102160-07	-		1102160-11RE	1		1102160-12		¥
FRACTION: OV	SAMP_DATE	2/14/2011	**		2/14/2011			2/15/2011			2/15/2011		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	93.0			94.4			93.7		114,1	88.7		***************************************
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHAN	ΙE	1.96	U		2.51	U		2.09	U		2.16	U	
1,1,2,2-TETRACHLOROE	THANE	1.96	U		2.51	U		2.09	U		2.16	U	
1,1,2-TRICHLOROETHAN	E	1.96	U		2.51	U		2.09	U		2.16	U	
1,1-DICHLOROETHANE		1.96	U		2.51	U		2.09	U		2.16	U	
1,1-DICHLOROETHENE	ý .	1.96	U		2.51	U		2.09	U		2.16	U	
1,2,4-TRICHLOROBENZE	NE	1.96	U		2.51	U		2.09	U		2.16	U	
1,2-DIBROMO-3-CHLORO	PROPANE	3.92	U		5.03	U		4.17	UJ	С	4.32	U	
1,2-DIBROMOETHANE		1.96	U		2.51	U		2.09	U		2.16	U	
1,2-DICHLOROBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
1,2-DICHLOROETHANE		1.96	U		2.51	U		2.09	U		2.16	U	
1,2-DICHLOROPROPANE		1.96	U		2.51	U		2.09	U		2.16	U	
1,3-DICHLOROBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
1,4-DICHLOROBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
2-BUTANONE		3.92	U		5.03	U		4.17	U		4.32	U	
2-HEXANONE		1.96	U		2.51	U		2.09	U		2.16	U	
4-METHYL-2-PENTANON	E	1.96	U		2.51	U		2.09	U		2.16	U	
ACETONE		9.96	J	CP	10.1	UJ	С	16.5	J	Р	8.63	UJ	С
BENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
BROMODICHLOROMETH	IANE	1.96	U		2.51	U		2.09	U		2.16	U	
BROMOFORM		1.96	U		2.51	U		2.09	U		2.16	U	
BROMOMETHANE		3.92	U		5.03	U		4.17	U		4.32	U	
CARBON DISULFIDE		1.96	U		2.51	U		2.09	U		2.16	U	
CARBON TETRACHLORI	DE	1.96	U		2.51	U		2.09	U		2.16	U	
CHLOROBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
CHLORODIBROMOMETH	IANE	1.96	U		2.51	U		2.09	U		2.16	U	
CHLOROETHANE		3.92	U		5.03	U		4.17	U		4.32	U	,
CHLOROFORM		1.96	U		2.51	U		2.09	U		2.16	U	
CHLOROMETHANE	¥-	3.92	U		5.03	U		4.17	U		4.32	U	
CIS-1,2-DICHLOROETHE	NE	1.96	U		2.51	U		2.09	U		2.16	U	
CIS-1,3-DICHLOROPROP	ENE	1.96	U		2.51	U		2.09	U	11	2.16	U	
CYCLOHEXANE		1.96	U		2.51	U		2.09	U		2.16	U	
DICHLORODIFLUOROME	THANE	3.92	UJ	С	5.03	UJ	С	4.17	UJ	С	4.32	UJ	С
ETHYLBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
ISOPROPYLBENZENE		1.96	U	i.	2.51	U		2.09	U		2.16	U	
M+P-XYLENES		3.92	U		5.03	U		4.17	U		4.32	U	
				-			- Access			******			******

PROJ_NO: 02125	NSAMPLE	DSY-SO-DUP	01-0214	11	DSY-SO-TB01	-02111	1
SDG: CTOWE20_001	LAB_ID	1102160-08	**		1102160-04		
FRACTION: OV	SAMP_DATE	2/14/2011			2/11/2011		
MEDIA: SOIL	QC_TYPE	FD			ТВ		
	UNITS	UG/KG			UG/KG	۸	
	PCT_SOLIDS	90.1		44			7-0
	DUP_OF	DSY-SB204-S	O-0002	7000			
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		2.5	U		2.5	U	
1,1,2,2-TETRACHLOROET	HANE	2.5	U.	-	2.5	U	
1,1,2-TRICHLOROETHANE		2.5	U		2.5	U	
1,1-DICHLOROETHANE		2.5	U		2.5	U	
1,1-DICHLOROETHENE		2.5	U		2.5	U	
1,2,4-TRICHLOROBENZEN	IE .	2.5	U		2.5	U	
1,2-DIBROMO-3-CHLOROF	PROPANE	5	U		5	U	
1,2-DIBROMOETHANE		2.5	U	=	2.5	U	
1,2-DICHLOROBENZENE		2.5	U		2.5	U	
1,2-DICHLOROETHANE		2.5	U		2.5	U	
1,2-DICHLOROPROPANE		2.5	U		2.5	U	
1,3-DICHLOROBENZENE		2.5	U		2.5	U	
1,4-DICHLOROBENZENE		2.5	U		2.5	U	
2-BUTANONE		3.26	J	Р	5	UJ	С
2-HEXANONE		4.96	J	Р	2.5	UJ	С
4-METHYL-2-PENTANONE		2.5	U		2.5	U	
ACETONE		31.4	J	С	10	U	
BENZENE		2.5	U		2.5	U	
BROMODICHLOROMETHA	NE	2.5	U		2.5	U	
BROMOFORM		2.5	U		2.5	UJ	С
BROMOMETHANE		5	U		5	UJ	С
CARBON DISULFIDE		2.5	U		2.5	U	
CARBON TETRACHLORID	E	2.5	U		2.5	U	
CHLOROBENZENE		2.5	U		2.5	U	
CHLORODIBROMOMETHA	NE	2.5	U		2.5	U	
CHLOROETHANE		5	U			U	
CHLOROFORM		2.5	U		2.5		
CHLOROMETHANE			U		5	U	
CIS-1,2-DICHLOROETHEN	E	2.5			2.5		
CIS-1,3-DICHLOROPROPE	NE	2.5			2.5		
CYCLOHEXANE		2.5	UJ U		2.5		
	DICHLORODIFLUOROMETHANE			С		UJ	С
ETHYLBENZENE		2.5 2.5			2.5		
ISOPROPYLBENZENE					2.5		
M+P-XYLENES		5	U		5	U	

3 of 6

PROJ_NO: 02125	NSAMPLE	DSY-SB204-S	0-0002	- 11242	DSY-SB204-S	O-0810		DSY-SB205-S	O-0002		DSY-SB205-S	O-088.	5
SDG: CTOWE20_001	LAB_ID	1102160-05			1102160-03		***	1102160-09		1000	1102160-10	yan — — —	
FRACTION: OV	SAMP_DATE	2/14/2011			2/11/2011			2/15/2011	3/4		2/15/2011		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	91.5			93.5			85.7			93.3		
	DUP_OF						,						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		5.52	υ		5.3	υ		5.43	U		4.36	U	
METHYL CYCLOHEXANE		2.76	υ		2.65	υ		2.72	U		2.18	U	
METHYL TERT-BUTYL ET	HER	2.76	U		2.65	U		2.72	U		2.18	U	
METHYLENE CHLORIDE		9.69	UJ	BP	21	U	В	9.67	UJ	BP	5.23	UJ	BP
O-XYLENE		2.76	U		2.65	U		2.72	U		2.18	U	
STYRENE		2.76	U		2.65	บ		2.72	U		2.18	U	
TETRACHLOROETHENE		2.76	U		2.65	U		2.72	U		2.18	U	
TOLUENE		2.76	υ		2.65	υ		2.72	υ		2.18	U	
TOTAL XYLENES		8.28	U		7.95	υ		8.15	υ		6.54	U	
TRANS-1,2-DICHLOROET	HENE	2.76	U		2.65	U		2.72	υ		2.18	U	
TRANS-1,3-DICHLOROPF	ROPENE	2.76	U	-	2.65	U		2.72	υ		2.18	U	
TRICHLOROETHENE		2.76	U		2.65	U		2.72	U		2.18	U	
TRICHLOROFLUOROMET	THANE	5.52	U		5.3	U		5.43	υ		4.36	U	
VINYL CHLORIDE		2.76	υ		2.65	υ		2.72	U		2.18	U	

PROJ_NO: 02125	NSAMPLE	DSY-SB206-S	O-0002		DSY-SB206-S	O-0810		DSY-SB207-S	O-0002		DSY-SB207-S	O-1012	
SDG: CTOWE20_001	LAB_ID	1102160-06			1102160-07			1102160-11RE	<b>1</b>		1102160-12		
FRACTION: OV	SAMP_DATE	2/14/2011			2/14/2011			2/15/2011			2/15/2011		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	93.0			94.4			93.7			88.7		
	DUP_OF	96										3-01	
PARAMETER	•	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		3.92	U		5.03	U		4.17	U		4.32	U	
METHYL CYCLOHEXANE		1.96	U		2.51	U		2.09	U		2.16	U	
METHYL TERT-BUTYL ETHER		1.96	U		2.51	U		2.09	U		2.16	U	
METHYLENE CHLORIDE	<b>=</b>	4.31	UJ	BP	7.87	UJ	BP	7.26	UJ	BP	6.67	UJ	BP
O-XYLENE		1.96	U		2.51	U		2.09	U		2.16	U	
STYRENE		1.96	U		2.51	U		2.09	U		2.16	U	
TETRACHLOROETHEN		1.96	U		2.51	U		2.09	U		2.16	U	
TOLUENE		1.96	U		2.51	U		2.09	U		2.16	U	
TOTAL XYLENES		5.88	U		7.54	U		6.26	U		6.47	U	
TRANS-1,2-DICHLOROE	THENE	1.96	U		2.51	U		2.09	U		2.16	U	
TRANS-1,3-DICHLOROF	PROPENE	1.96	U		2.51	U		2.09	U		2.16	U	
TRICHLOROETHENE		1.96	U		2.51	U	(*)	2.09	U		2.16	U	
TRICHLOROFLUOROME	ETHANE	3.92	U		5.03	U		4.17	U		4.32	U	
VINYL CHLORIDE		1.96	U		2.51	U		2.09	U		2.16	U	

PROJ_NO: 02125	NSAMPLE	DSY-SO-DUP	01-0214	11	DSY-SO-TB01	-021111	-
SDG: CTOWE20_001	LAB_ID	1102160-08			1102160-04		
FRACTION: OV	SAMP_DATE	2/14/2011			2/11/2011		
MEDIA: SOIL	QC_TYPE	FD			ТВ		
	UNITS	UG/KG			UG/KG		
	PCT_SOLIDS	90.1		***************************************			
	DUP_OF	DSY-SB204-S	0-0002				
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		5	U		5	UJ	С
METHYL CYCLOHEXANE		2.5	U		2.5	U	
METHYL TERT-BUTYL ET	HER	2.5	U		2.5	U	
METHYLENE CHLORIDE		10.5	U	В	8.6	J	P
O-XYLENE		2.5	U		2.5	U	
STYRENE		2.5	U		2.5	U	
TETRACHLOROETHENE		2.5	U		2.5	U	
TOLUENE		2.5	U		2.5	U	
TOTAL XYLENES		7.5	U		7.5	U	
TRANS-1,2-DICHLOROET	HENE	2.5	U		2.5	U	
TRANS-1,3-DICHLOROPR	OPENE	2.5	U		2.5	U	
TRICHLOROETHENE	2.5	U		2.5	U		
TRICHLOROFLUOROMET	HANE	5	U		5	U	
VINYL CHLORIDE		2.5	U		2.5	U	

PROJ_NO: 02125	NSAMPLE	DSY-SB201-S	O-0204		DSY-SB202-S	O-0204		DSY-SB204-S	O-0002		DSY-SB204-S	O-0810	
SDG: CTOWE20_001	LAB_ID	1102160-02			1102160-01		*	1102160-05			1102160-03		
FRACTION: PAH	SAMP_DATE	2/11/2011			2/9/2011			2/14/2011			2/11/2011		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	88.1			90.6			91.5			93.5		
	DUP_OF												
PARAMETER	*	RESULT	VQL	QLCD									
2-METHYLNAPHTHALEI	NE .	3.66	U		3.61	U		18	U		3.42	U	
ACENAPHTHENE		3.66	U		3.61	U		18	U		3.42	U	
ACENAPHTHYLENE		3.66	U		3.61	U		18	U		3.42	U	
ANTHRACENE		3.66	U		3.61	U		18	U		3.42	U	
BENZO(A)ANTHRACEN	Ξ	3.66	UJ	С	3.61	UJ	С	22.5	J	СР	3.42	UJ	С
BENZO(A)PYRENE	- 49	3.66	U		3.61	U		14.5	J	Р	3.42	U	
BENZO(B)FLUORANTHE	ENE	3.66	U		3.61	U		22.1	J	Р	3.42	U	
BENZO(G,H,I)PERYLEN	E	3.66	U		3.61	U		18	U		3.42	U	
BENZO(K)FLUORANTHE	ENE	3.66	U		3.61	U		18	U		3.42	U	
CHRYSENE		3.66	U		3.61	U		24.1	J	Р	3.42	U	
DIBENZO(A,H)ANTHRAG	CENE	3.66	U		3.61	U		18	U		3.42	U	
FLUORANTHENE		3.66	U		3.61	U		31	J	P	3.42	U	
FLUORENE		3.66	U		3.61	U		18	U		3.42	U	
INDENO(1,2,3-CD)PYRE	NE	3.66	U		3.61	U		15.1	J	Р	3.42	U	
NAPHTHALENE		3.66	U		3.61	U		18	U		3.42	U	
PHENANTHRENE		3.66	U		3.61	U		13.6	J	Р	3.42	U	
PYRENE		3.66	U		3.61	U		31.2	J	Р	3.42	U	

PROJ_NO: 02125	NSAMPLE	DSY-SB205-S	O-0002		DSY-SB205-S	O-088.	5	DSY-SB206-S	O-0002		DSY-SB206-	SO-0810	
SDG: CTOWE20_001	LAB_ID	1102160-09	-		1102160-10		****	1102160-06			1102160-07		
FRACTION: PAH	SAMP_DATE	2/15/2011			2/15/2011			2/14/2011			2/14/2011		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG		17.0	UG/KG		
	PCT_SOLIDS	85.7			93.3			93.0			94.4		
	DUP_OF				-		10.41		*******			V-1	
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALEN	IE .	18.9	U		3.48	U		3.56	U		3.5	3 U	
ACENAPHTHENE		17.8	J	Р	3.62	J	Р	3.56	U		3.5	3 U	
ACENAPHTHYLENE		19.9	J	Р	3.53	J	Р	3.56	U		3.5	3 U	Ì
ANTHRACENE		51.1			8			3.56	U		3.5	3 U	
BENZO(A)ANTHRACENE		232	J	С	27	J	С	3.56	UJ	С	3.5	3 UJ	С
BENZO(A)PYRENE		165			23.3			3.56	U		3.5	3 U	
BENZO(B)FLUORANTHE	NE	263			41.1			3.56	U		3.5	3 U	
BENZO(G,H,I)PERYLENE	Ī	119			21.6			1.92	J	Р	3.5	3 U	
BENZO(K)FLUORANTHE	NE	92.4			11.2			3.56	U		3.5	3 U	
CHRYSENE		238			32.1			3.56	U		3.5	3 U	
DIBENZO(A,H)ANTHRAC	ENE	124			23.3			3.56	U		3.5	3 U	
FLUORANTHENE		424			55.3			3.56	U		3.5	3 U	
FLUORENE		21.7	J	Р	2.93	J	Р	3.56	U		3.5	3 U	
INDENO(1,2,3-CD)PYRE	NE	99.1			18			3.56	U		3.5	3 U	
NAPHTHALENE		18.9	U		3.54	J	Р	3.56	U		3.5	3 U	
PHENANTHRENE		235			30.8			3.56	U		3.5	3 U	
PYRENE		371			47.4			3.05	J	Р	3.5	3 U	

PROJ_NO: 02125	NSAMPLE	DSY-SB207-S	O-0002		DSY-SB207-S	SO-1012	2	DSY-SO-DUP	01-0214	411
SDG: CTOWE20_001	LAB_ID	1102160-11			1102160-12			1102160-08		
FRACTION: PAH	SAMP_DATE	2/15/2011		***************************************	2/15/2011			2/14/2011		
MEDIA: SOIL	QC_TYPE	NM			NM		-	FD		
	UNITS	UG/KG			UG/KG		799	UG/KG		
	PCT_SOLIDS	93.7			88.7			90.1		
	DUP_OF							DSY-SB204-S	O-0002	
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALEN	ΙE	14.5	J	Р	3.63	3 U		17.9	U	
ACENAPHTHENE		17.2	U		3.60	U		17.9	U	
ACENAPHTHYLENE		17.2	U		3.60	3 U		17.9	U	
ANTHRACENE		17.2	U		3.63	3 U		17.9	U	
BENZO(A)ANTHRACENE		31.8	J	CP	3.63	UJ	С	17.9	UJ	С
BENZO(A)PYRENE		29.6	J	Р	3.60	U		17.9	U	<u> </u>
BENZO(B)FLUORANTHE	NE	54		,	2.69	5 J	Ρ .	17.9	U	
BENZO(G,H,I)PERYLENE	<b>1</b>	25.8	J	Р	2.5	J	Р	17.9	U	
BENZO(K)FLUORANTHE	NE	15.8	J	Р	3.60	3 U		17.9	U	
CHRYSENE		39.8			3.60	3 U		17.9	U	
DIBENZO(A,H)ANTHRAC	ENE	17.2	U		3.63	3 U		17.9	U	
FLUORANTHENE		50.6			2.19	J	Р	17.9	U	
FLUORENE		17.2	U		3.60	3 U		17.9	U	
INDENO(1,2,3-CD)PYREI	NE	24.6	J	Р	3.63	3 U		17.9	U	
NAPHTHALENE		18.4	J	Р	3.63	3 U		17.9	U	
HENANTHRENE		34.5			2.1	J	Р	17.9	U	
PYRENE					2.0	5 J	Р	17.9	U	

PROJ_NO: 02125	NSAMPLE	DSY-SB204-S	O-0002		DSY-SB204-S	O-0810		DSY-SB205-S	O-0002		DSY-SB205-S	SO-088.5	5
SDG: CTOWE20_001	LAB_ID	1102160-05			1102160-03			1102160-09			1102160-10		
FRACTION: PET	SAMP_DATE	2/14/2011			2/11/2011		***	2/15/2011			2/15/2011		
MEDIA: SOIL	QC_TYPE			NM			NM			NM			
	UNITS	MG/KG						MG/KG			MG/KG	2001/200	
	PCT_SOLIDS	91.5		1.70	93.5			85.7			93.3		
	DUP_OF									10.00			
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIESEL RANGE ORGANIC	cs	7.08	U		7.49			29.8			6.99	U	
GASOLINE RANGE ORGA	NICS	5.87	U		5.09	U		4.48	U		4.22	2 U	

PROJ_NO: 02125	NSAMPLE	DSY-SB206-S	O-0002		DSY-SB206-S	O-0810		DSY-SB207-S	O-0002		DSY-SB207-S	O-1012	
SDG: CTOWE20_001	LAB_ID	1102160-06		7.41.0	1102160-07			1102160-11			1102160-12		54-74
FRACTION: PET	SAMP_DATE	2/14/2011			2/14/2011	-		2/15/2011			2/15/2011		
MEDIA: SOIL	QC_TYPE	NM			NM	1		NM			NM		
	UNITS M PCT_SOLIDS 9:				MG/KG	20.46.7		MG/KG			MG/KG		
					94.4			93.7			88.7		
	DUP_OF				101								-7
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIESEL RANGE ORGANI	cs	7.11	U		6.83	U		31.6			7.31	U	
GASOLINE RANGE ORGA	ANICS	5.52	U		5.04	U		4.06	U		4.9	U	

PROJ_NO: 02125	NSAMPLE	DSY-SO-DUP	01-0214	11	DSY-SO-TB01	I-02111	1
SDG: CTOWE20_001	LAB_ID	1102160-08	112.5		1102160-04		
FRACTION: PET	SAMP_DATE	2/14/2011			2/11/2011		
MEDIA: SOIL	QC_TYPE	FD			ТВ		
	UNITS	MG/KG			MG/KG		
	PCT_SOLIDS	90.1					
	DUP_OF	DSY-SB204-S	O-0002				
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIESEL RANGE ORGAN	12.8	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
GASOLINE RANGE ORG	4.28	U		5	U		

## APPENDIX F SUPPORTING INFORMATION FOR HUMAN HEALTH RISK ASSESSMENT

### **APPENDIX F**

### SUPPORTING INFORMATION FOR HUMAN HEALTH RISK ASSESSMENT

- F.1 Samples Used in Risk Assessment
- F.2 RAGS Part D Tables
- F.3 ProUCL Outputs
- F.4 Sample Calculations
- F.5 Screening Risk Evaluation for Vapor Intrusion
- F.6 RAGS Part D Tables for Chemicals Present at Naturally Occurring Levels

### **APPENDIX F.1**

SAMPLES USED IN RISK ASSESSMENT

TABLE 1 NORTH WATERFRONT

SURFACE SOIL	SUBSURFA	ACE SOIL	GROUNDWATER
Unpaved Areas	DSY-S-MW02-1820	DSY-S-TP16-1112	DSY-GW-MW02A-022411
DSY-S-MW02-SS01	DSY-S-MW02-2426	DSY-S-TP18-0507	DSY-GW-MW03-022411
DSY-S-MW03-0_501	DSY-S-MW02-3436	DSY-S-TP18-1011	DSY-GW-MW11A-022611
DSY-S-MW04-SS01	DSY-S-MW03-0810	DSY-S-TP19-0507	DSY-GW-MW11A-022611-D
DSY-S-MW11-0001	DSY-S-MW03-1618	DSY-S-TP19-1011	DSY-GW-MW12-030311
DSY-S-MW12-SS01	DSY-S-MW04-0810	DSY-S-TP20-0507	DSY-GW-MW204-031711
DSY-SB-11-0002	DSY-S-MW04-1618	DSY-S-TP20-1011	DSY-GW-MW220-030111
DSY-SB205-SO-0002	DSY-S-MW11-0103	DSY-S-TP21-0507	DSY-GW-MW221-030211
DSY-SB207-SO-0002	DSY-S-MW11-1113	DSY-S-TP21-1011	DSY-GW-MW222-030211
	DSY-S-MW11-1113-D	DSY-S-TP22-0506	DSY-GW-MW223-031611
Paved Areas	DSY-S-MW11-2729	DSY-S-TP22-1112	DSY-A-MW02-01
DSY-SB204-SO-0002	DSY-S-MW11-2931	DSY-S-TP23-0507	DSY-A-MW03-01
DSY-SB204-SO-0002-D	DSY-S-MW11-2931-D	DSY-S-TP23-0910	DSY-A-MW03-01-D
DSY-SB206-SO-0002	DSY-S-MW12-SS05	DSY-S-TP24-0102	DSY-A-MW04-01
DSY-S-TP16-0001	DSY-S-MW12-SS12	DSY-S-TP24-0102-D	DSY-A-MW11-01
DSY-S-TP18-0001	DSY-S-MW12-SS16	DSY-S-TP24-0507	DSY-A-MW12-01
DSY-S-TP18-0001-D	DSY-SB204-SO-0810	DSY-S-TP24-1011	
DSY-S-TP19-0001	DSY-SB205-SO-088.5	DSY-S-TP27-0507	
DSY-S-TP20-0001	DSY-SB206-SO-0810	DSY-S-TP27-1011	
DSY-S-TP21-0001	DSY-SB207-SO-1012	DSY-S-TP28-0507	
DSY-S-TP22-0001	DSY-S-TP16-0506	DSY-S-TP28-1314	
DSY-S-TP23-0001			
DSY-S-TP27-0001			
DSY-S-TP28-0001			

All samples were used in the selection of chemicals of potential concern.

All soil samples were used to calculate exposure point concentrations for soil.

Samples used to calculate exposure point concentrations for groundwater are shaded.

## SOIL GAS DSY-SG-MW02A-0708 DSY-SG-MW03-0608

DSY-SG-MW03-0608-D DSY-SG-MW11A-0203 DSY-SG-MW12-0506

TABLE 2 CENTRAL SHIPYARD

SURFACE SOIL	SUBSURFA	ACE SOIL	GROUNDWATER
Unpaved Areas	DSY-S-MW04-3234	S42 SWN	DSY-A-MW05-01
DSY-S-MW07-0001	DSY-S-MW05-1012	S42 SWS	DSY-A-MW07-01
DSY-S-TP11-0001	DSY-S-MW05-2224	S42 SWW	DSY-GW-MW218-030111
	DSY-S-MW05-3234	DSY-SB-01-0911	DSY-GW-MW219-031611
Paved Areas	DSY-S-MW05-4446	DSY-SB-03-0911	DSY-GW-MW219-031611-D
DSY-S-MW05-SS01	DSY-S-MW07-0810	DSY-SB-09-1416	
DSY-S-MW05-SS01-D	DSY-S-MW07-1618	DSY-SB-10-1416	
DSY-S-TP12-0001	DSY-S-MW07-1618-D	DSY-SB-14-0103	
DSY-S-TP15-0001	DSY-S-MW07-2224	DSY-SB-14-0103-D	
DSY-S-TP17-0001	DSY-S-MW07-3436	DSY-SB-15-0103	
	N1-0	DSY-S-TP11-0507	
	N1-100	DSY-S-TP11-1213	
	N1-150	DSY-S-TP12-0507	
	N1-200	DSY-S-TP12-1213	
	N1-250	DSY-S-TP13-0506	
	N1-50	DSY-S-TP13-0506-D	
	N1-A	DSY-S-TP13-1011	
	N1-B	DSY-S-TP15-0506	
	N1-C	DSY-S-TP15-1112	
	N1-D	DSY-S-TP17-0507	
	N1-E	DSY-S-TP17-1112	
	S1	DSY-S-TP25-0507	
	S42 BOT	DSY-S-TP25-1011	
	S42 SWE	DPSOIL02	

All samples were used in the selection of chemicals of potential concern.

All soil samples were used to calculate exposure point concentrations for soil.

Samples used to calculate exposure point concentrations for groundwater are shaded.

TABLE 3
FORMER BUILDING 234 - SOIL SAMPLES

SURFACE SOIL Unpaved Areas	SUBSURFACE SOIL DSY-S-MW08-0810	GROUNDWATER DSY-A-MW08-01
DSY-S-MW08-SS01	DSY-S-MW09-1012	DSY-A-MW08-01-D
DSY-S-MW09-0001	DSY-S-MW09-1012-D	DSY-A-MW09-01
MW09TP01	DSY-S-MW09-2022	DSY-A-MW104-01
DSY-S-TP07-0001	DSY-S-MW09-3032	DSY-GW-MW08-030111
DSY-S-TP09-0001	DSY-S-MW09-3638	
DSY-S-TP10-0001	DSY-SB-04-0406	
DSY-S-TP26-0001	DSY-SB-06-0204	
	DSY-S-TP08-0406	
Paved Areas	DSY-S-TP08-0910	
DSY-S-TP08-0001	DSY-S-TP09-0406	
DSY-S-TP08-0001-D	DSY-S-TP09-0910	
	DSY-S-TP10-0507	
	DSY-S-TP10-1213	
	DSY-S-TP26-0305	
	DSY-S-TP26-0406	
	DSY-S-TP26-0910	

All samples were used in the selection of chemicals of potential concern.
All soil samples were used to calculate exposure point concentrations for soil.
Samples used to calculate exposure point concentrations for groundwater are shaded.

### TABLE 4 SOUTH WATERFRONT - SOIL SAMPLES

### **SUBSURFACE SOIL**

DSY-SB201-SO-0204

DSY-SB202-SO-0204

DSY-S-TP01-1112

DSY-S-TP02-1516

DSY-S-TP05-1213

DSY-S-TP06-1213

All samples were used in the selection of chemicals of potential concern. All soil samples were used to calculate exposure point concentrations for soil.

### TABLE 5 PCB REMOVAL AREA - SOIL SAMPLES

SURFACE SOIL	SUBSURFACE SOIL
Unpaved Areas	DSY-S-MW06-0406
DSY-S-MW06-SS01	DSY-SO-SB210-0102
DSY-SO-SB208-000.5	DSY-SO-SB211-0102
DSY-SO-SB208-000.5-D	DSY-SO-SB212-0204
DSY-SO-SB215-000.5	DSY-SO-SB213-0203
DSY-SO-SB216-000.5	DSY-SO-SB214-0203
DSY-SO-SB217-000.5	B6-S6
DSY-SO-SB224-000.5	
DSY-SO-SB224-000.5-D	

### **Paved Areas**

DSY-SO-SB209-0.30.7 B6-S1

All samples were used in the selection of chemicals of potential concern. All soil samples were used to calculate exposure point concentrations for soil.

**APPENDIX F.2** 

**RAGS-PART D TABLES** 

RAGS Part D Table 1
Selection of Exposure Pathways

# TABLE 1 SELECTION OF EXPOSURE PATHWAYS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 4

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Surface Soil	Surface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Industrial workers may contact surface soil during normal work activities.
	ļ			Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	Quant Quant	
					Adult	Ingestion Dermal	Quant Quant	Trespassers may contact surface soil while at the site.
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	Quant	Industrial workers may be exposed to fugitive dust and volatile emissions during work activities.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Trespassers	Adolescents	Inhalation	Quant	Transpage may be approad to finitive dust and valetile emissions while at the site
					Adult	Inhalation	Quant	Trespassers may be exposed to fugitive dust and volatile emissions while at the site.
	Subsurface Soil	Subsurface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	None None	Current industrial workers are not exposed to subsurface soil.
	ļ			Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	None None	Current trespassers are not exposed to subsurface soil.
					Adult	Ingestion Dermal	None None	Sulfatilitiespassors are not expessed to design the sulfatilities.
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	None	Current industrial workers are not exposed to subsurface soil.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trespassers	Adolescents	Inhalation	None	Current trespassers are not exposed to subsurface soil.
					Adult	Inhalation	None	ouncil ilespussers are not expected to appointed total.
	Groundwater	Groundwater	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	None None	Current industrial workers are not exposed to groundwater.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with ground water during excavation activities.
				Trespassers Users	Adolescents	Ingestion Dermal	None None	Current trespassers are not exposed to groundwater.
					Adult	Ingestion Dermal	None None	Sandra de Parente de Maria de Parente de Branche de Maria

# TABLE 1 SELECTION OF EXPOSURE PATHWAYS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 4

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	None	Current industrial workers are not exposed to groundwater.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Trespassers	Adolescents	Inhalation	None	Correct transport are not averaged to provide the
					Adult	Inhalation	None	Current trespassers are not exposed to groundwater.
	,		Vapor Intrusion	Industrial Worker	Adult	Inhalation	None	At present there are no buildings on the site.
Future	Surface Soil	Surface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Industrial workers may contact surface soil during normal work activities.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	Quant Quant	Trespassers may contact surface soil while at the site.
					Adult	Ingestion Dermal	Quant Quant	Trespassers may contact surface soil write at the site.
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site
					Adult	Ingestion Dermal	Quant Quant	this scenario is included to aid in future risk management decisions.
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	Quant	Industrial workers may be exposed to fugitive dust and volatile emissions during work activities.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Trespassers	Adolescents	Inhalation	Quant	Trespassers may be exposed to fugitive dust and volatile emissions while at the site.
					Adult	Inhalation	Quant	Trespassers may be exposed to fuglifive dust and voidine emissions while at the site.
				Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site
					Adult	Inhalation	Quant	this scenario is included to aid in future risk management decisions.
	Subsurface Soil	Subsurface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by industrial workers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.

# TABLE 1 SELECTION OF EXPOSURE PATHWAYS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 4

Scenario Timeframe	Medium	Exposure	Exposure	Bassatas				1				
Future		Medium	Point	Receptor Population	Receptor Age	Rationale for Selection or Exclusion of Exposure Pathway						
	Subsurface Soil	Subsurface Soil	Derecktor Shipyard	Trespassers	Adolescents	Ingestion	Quant					
		İ						Although exposures to subsurface soil by trespassers is considered unlikely at the site this				
					Adult	Ingestion	Quant	scenario is included to aid in future risk management decisions.				
				Residents	Child	Ingestion	Quant					
	į					Dermal	Quant	Although a future residential scenario is considered unlikely at the site				
					Adult	Ingestion	Quant	this scenario is included to aid in future risk management decisions.				
						Dermal	Quant					
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	Quant	Although exposures to subsurface soil by industrial workers is considered unlikely at the site this scenario is included to aid in future risk management decisions.				
		İ		Construction Workers	Adult	Inhalation	Quant	Construction workers may have contact with subsurface soil during excavation activities.				
				Trespassers	Adolescents	Inhalation	Quant	Although exposures to subsurface soil by trespassers is considered unlikely at the site this				
					Adult	Inhalation	Quant	scenario is included to aid in future risk management decisions.				
				Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site				
					Adult	Inhalation	Quant	this scenario is included to aid in future risk management decisions.				
Future	Groundwater	Groundwater	Derecktor Shipyard	Industrial Worker	Adult	Ingestion	Quant Quant	Future industrial workers may be exposed to groundwater if groundwater was used as a water supply.				
				Construction	Adult	Dermal Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater				
1				Workers			<u> </u>	during excavation activities.				
				Trespassers	Adolescents	Ingestion	None					
į				Users	A at at	Dermal	None	Future trespassers are not expected to be exposed to groundwater.				
					Adult	Ingestion Dermal	None None					
		1		Residents	Child	Ingestion	Quant					
				nesidents	Cillia	Dermal	Quant	Although a future residential scenario is considered unlikely at the site				
ŀ					Adult	Ingestion	Quant	this scenario is included to aid in future risk management decisions.				
				1	2001	Dermal	Quant					
		Air	Derecktor Shipyard	Industrial	Adult	Inhalation	None	Future industrial workers are not exposed to be exposed to COPCs that have volatilized from				
į		7 111	Doroomor Ompyard	Worker		management		groundwater.				
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.				
				Trespassers	Adolescents	Inhalation	None					
					Adult	Inhalation	None	Future trespassers are not expected to be exposed to groundwater.				

# TABLE 1 SELECTION OF EXPOSURE PATHWAYS FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 OF 4

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Air	Derecktor Shipyard	Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site
					Adult	Inhalation	Quant	this scenario is included to aid in future risk management decisions.
			Vapor Intrusion	Industrial Worker	Adult	Inhalation		Future industrial workers could be exposed to COPCs that have volatilized from groundwater and migrated through building foundations and into indoor air.
				Residents	Child	Inhalation	Qual	Hypothetical residents could be exposed to COPCs that have volatilized from groundwater
					Adult	Inhalation	Qual	and migrated through building foundations and into indoor air.

Notes:

Qual - Qualitative.

Quant - Quantitative.

### **RAGS Part D Table 2**

Occurrence, Distribution and Selection Of Chemicals of Potential Concern

## LIST OF TABLES RAGS PART D TABLE 2 OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Table No.	
2.1	Surface Soil - Direct Contact - North Waterfront
2.2	Subsurface Soil - Direct Contact - North Waterfront
2.3	Groundwater - Direct Contact - North Waterfront
2.4	Groundwater - Vapor Intrusion - North Waterfront
2.5	Soil Gas - North Waterfront
2.6	Surface Soil - Direct Contact - Central Shipyard
2.7	Subsurface Soil - Direct Contact - Central Shipyard
2.8	Groundwater - Direct Contact - Central Shipyard
2.9	Groundwater - Vapor Intrusion - Central Shipyard
2.10	Surface Soil - Direct Contact - Former Building 234
2.11	Subsurface Soil - Direct Contact - Former Building 234
2.12	Groundwater - Direct Contact - Former Building 234
2.13	Groundwater - Vapor Intrusion - Former Building 234
2.14	Subsurface Soil - Direct Contact - South Waterfront
2.15	Surface Soil - Direct Contact - PCB Removal Area
2.16	Subsurface Soil - Direct Contact - PCB Removal Area

## TABLE 2.1 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Current/Future Medium: Surface Soil Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
North Waterfront	78-93-3	panic Compounds 2-Butanone	3.01 J	3.26 J	ug/kg	DSY-SB204-SO-0002-D	T 1/19	3.92 - 12	3.26	NA	2,800,000 N	10,000,000	No	BSL
waterront	591-78-6	2-Hexanone	3.17 J	4.96 J	ug/kg ug/kg	DSY-SB204-SO-0002-D	1/19	1.96 - 12	4.96	NA NA	21,000 N	10,000,000 NA	No	BSL
	67-64-1	Acetone	9.96 J	120	ug/kg	DSY-S-TP18-0001-D	10/19	10 - 41	120	NA NA	6,100,000 N	7,800,000	No	BSL
	71-43-2	Benzene	1 J	1 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	1	NA	1,100 C	2,500	No	BSL
	75-15-0	Carbon Disulfide	3.28 J	3.28 J	ug/kg	DSY-SB205-SO-0002	1/19	1.96 - 12	3.28	NA	82,000 N	NA	No	BSL
	108-90-7		3 J	3 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	3	NA	29,000 N	210,000	No	BSL
	108-88-3	Toluene	1 J	4 J	ug/kg	DSY-S-TP23-0001	6/19	1.96 - 11	4	NA	500,000 N	190,000	No	BSL
	1330-20-7		1 J	. 2 J	ug/kg	DSY-S-TP23-0001	2/19	5.88 - 12	2	NA	63,000 N	110,000	No	BSL
	79-01-6		2 J	2 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	22	NA NA	440 N <sup>(8)</sup>	13,000	No	BSL
		e Organic Compounds	20.1	39 J		Deve This cool h	1/15	1 220 10000	20	NA	4,600 C	NA NA	No	BSL
	108-60-1 91-57-6	2,2'-Oxybis(1-Chloropropane) 2-Methylnaphthalene	39 J 14.5 J	14.5 J	ug/kg ug/kg	DSY-S-TP18-0001-D DSY-SB207-SO-0002	1/15	330 - 12000 3.56 - 12000	39 14.5	NA NA	23,000 N	123,000	No	BSL
	83-32-9	Acenaphthene	17.8 J	17.8 J	ug/kg	DSY-SB205-SO-0002	2/19	3.56 - 12000	17.8	NA.	340.000 N	43,000	No	BSL
	208-96-8	Acenaphthylene	19.9 J	19.9 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	19.9	NA NA	340,000 N <sup>(9)</sup>	23,000	No	BSL
	120-12-7	Anthracene	51.1	51.1	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	51.1	NA NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	15.7 J	710 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	710	NA NA	150 C	900	Yes	ASL
	50-32-8	Benzo(a)pyrene	11.7 J	680 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	680	NA NA	15 C	400	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	15.5 J	1,000 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,000	NA NA	150 C	900	Yes	ASL
	191-24-2	Benzo(g,h,i)perylene	1.92 J	119	ug/kg	DSY-SB205-SO-0002	4/19	17.9 - 12000	119	NA	170,000 N <sup>(10)</sup>	800	No	BSL
	207-08-9	Benzo(k)fluoranthene	15.8 J	92.4	ug/kg	DSY-SB205-SO-0002	3/19	3.56 - 12000	92.4	NA NA	1,500 C	900	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	44 J	150 J	ug/kg	DSY-S-TP18-0001	8/15	330 - 12000	150	NA	35,000 C	46,000	No	BSL
	218-01-9	Chrysene	16.5 J	690 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	690	NA	15,000 C	400	Yes	ASL
	53-70-3	Dibenzo(a,h)anthracene	124	124	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	124	NA	15 C	400	Yes	ASL
	206-44-0	Fluoranthene	20 J	1,400 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,400	NA	230,000 N	20,000	No	BSL
	86-73-7	Fluorene	21.7 J	21.7 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	21.7	NA NA	230,000 N	28,000	No	BSL
	67-72-1	Hexachioroethane	55 J	55 J	ug/kg	DSY-S-TP20-0001	1/15	330 - 12000	55	NA	4.300 N <sup>(8)</sup>	46,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	12 J	520 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	520	NA NA	150 C	900	Yes	ASL
	91-20-3	Naphthalene	18.4 J	18.4 J	ug/kg	DSY-SB207-SQ-0002	1/19	3.56 - 12000	18.4	NA	3,600 C	54,000	No	BSL
	85-01-8	Phenanthrene	11.3 J	730 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	730	NA	170,000 N <sup>(10)</sup>	40,000	No	BSL
	108-95-2	Phenol	170 J	170 J	ug/kg	DSY-S-TP18-0001	1/15	330 - 12000	170	NA NA	1,800,000 N	6,000,000	No	BSL
	129-00-0		3.05 J	1,400 J	ug/kg	DSY-S-TP16-0001	6/19	17.9 - 410	1,400	NA NA	170,000 N	13,000	No	BSL
	Pesticides/		0.000	1,1000	ug, ng	20.0	1 . 0, 10	11.0 1.0	1,,,,,,		110,000 11	,,	1	
		4.4'-DDE	22	22	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	22	NA	1.400 C	NA NA	No	BSL
	50-29-3	4,4'-DDT	56	56	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	56	NA	1,700 C	NA.	No	BSL
	5103-71-9	· ·	2	7.3	ug/kg	DSY-S-TP28-0001	2/15	1.7 - 2.1	7.3	NA	1,600 C <sup>(11)</sup>	NA NA	No	BSL
	11096-82-5	The Control of the Co	24 J	7.5 24 J	ug/kg	DSY-S-TP16-0001	1/15	32 - 41	24	NA NA	220 C	NA NA	No	BŠL
	60-57-1	Dieldrin	16	16	ug/kg	DSY-S-TP16-0001	1/15	3.2 - 4.1	16	NA NA	30 C	40	No	BSL
	72-20-8	Endrin	5.7	26	ug/kg	DSY-S-TP16-0001	2/15	3.2 - 3.6	26	NA NA	1,800 N	NA NA	No	BSL
	5103-74-2		2.4	2.4		DSY-S-MW03-0 501	2/15	1.7 - 2.1	2.4	NA NA	1,600 C <sup>(11)</sup>	NA.	No	BSL
		gamma-Chlordane Heptachlor Epoxide	4.2	4.2	ug/kg ug/kg	DSY-S-TP28-0001	1/15	1.7 - 2.1	4.2	NA NA	53 C	NA NA	No	BSL
	Metals	[Heptachiol Epoxide	4.2	4.2	ug/kg	D31-3-11 20-0001	1/13	1.7 - 2.1	4.2	I IVA	33.0	1 140	110	DOL
		Aluminum	3,440 J	9,650	mg/kg	DSY-SB205-SO-0002	19/19	I .	9.650	16.020	7,700 N	NA	No	BKG
	7440-38-2		2.41	10.9 J	mg/kg	DSY-S-TP28-0001	17/19	2.9 - 3.3	10.9	13	0.39 C	7	No	BKG
	7440-38-2		5.1	49.4	mg/kg	DSY-S-TP16-0001	18/19	4.1 - 4.1	49.4	51	1,500 N	5,500	No	BSL, BKG
	7440-41-7		0.18 J	1.1	mg/kg	DSY-S-TP16-0001	10/19	0.15 - 0.21	1.1	0.58	16 N	1.5	No	B\$L
	7440-43-9		0.85 J	0.85 J	mg/kg	DSY-S-TP16-0001	1/19	0.109 - 0.64	0.85	0.17	7 N	39	No	BSL
	7440-70-2		237	2,290	mg/kg	DSY-SB205-SO-0002	18/19	91.1 - 91.1	2,290	1,598	NA NA	NA NA	No	NUT
		Chromium	5.2	24.1	mg/kg	DSY-S-TP16-0001	17/19	6.5 - 6.9	24.1	16	0.29 C <sup>(12)</sup>	390 (12)	Yes	ASL
	7440-47-3		2.6	14.7	mg/kg	DSY-S-TP16-0001	17/19	3.5 - 4.6	14.7	9	2.3 N	NA	Yes	ASL
	7440-48-4		3.1	111	mg/kg	DSY-S-TP16-0001	19/19	3.5 - 4.0	111	12	310 N	3,100	No	BSL
	7439-89-6		11.200 J	27.100	mg/kg	DSY-SB205-SO-0002	19/19	<del>                                     </del>	27,100	24.200	5.500 N	NA	Yes	ASL
	7439-89-6		2.3 J	27,100 115 J	mg/kg	DSY-S-TP28-0001	19/19	<del>                                     </del>	115	40	400	150	No	BSL
		Magnesium	1,320	2,680	mg/kg	DSY-SB205-SO-0002	19/19	<del></del>	2,680	2,571	NA NA	NA	No	NUT
		Manganese	81.4 J	340 J	mg/kg	DSY-S-TP23-0001	19/19	<del> </del>	340	349	180 N	390	No	BKG
	7439-97-6	1	0.0204 J	0.06	mg/kg	DSY-S-MW03-0 501	4/19	0.0292 - 0.17	0.06	0.18	2.3 N <sup>(13)</sup>	23	No	BSL, BKG
			8.2 J	68.5	mg/kg	DSY-S-TP16-0001	13/19	9.3 - 14.4	68.5	15	150 N	1,000	No	BSL BSL
	7440-02-0	ntinued)	L 0.2 J	00.0	mg/kg	201-0-11 10-0001	1 13/13	J 5.5 - 14.4	00.0	15	130 N	1,000	INU	DOL

### TABLE 2.1

### OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, THODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Current/Future Medium: Surface Soil Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
	7440-09-7	Potassium	198	639 J	mg/kg	DSY-SB206-SO-0002	19/19		639	651	NA	NA	No	NUT, BKG
	7782-49-2	Selenium	0.63 J	1 J	mg/kg	DSY-S-MW12-SS01	6/17	0.273 - 0.85	1	0.57	39 N	390	No	BSL
	7440-23-5	Sodium	19.7 J	172	mg/kg	DSY-S-TP16-0001	7/19	11.7 - 343	172	231	. NA	NA .	No	NUT, BKG
	7440-62-2	Vanadium	6.4	39	mg/kg	DSY-S-TP28-0001	19/19	-	39	34	39 N	550	No	BSL
	7440-66-6	Zinc	22.8	883	mg/kg	DSY-S-TP16-0001	19/19	-	883	62	2,300 N	6,000	No	BSL
		us Parameters												
	1002-53-5	Dibutyltin	5.2 J	33	ug/kg	DSY-S-TP16-0001	2/15	49 - 50	33	ΝA	1,800 N	NA	No	BSL
}	78763-54-9	Monobutyltin	33	33	ug/kg	DSY-S-TP16-0001	1/15	49 - 50	33	NA	1,800 N <sup>(14)</sup>	NA	No	BSL
		Tetrabutyltin	2.5 J	5.8 J	ug/kg	DSY-S-TP22-0001	4/15	49 - 50	5.8	NA	1,800 N <sup>(14)</sup>	NA NA	No	BSL
	56573-85-4	TributyItin	3.6 J	30 J	ug/kg	DSY-S-TP16-0001	3/15	49 - 50	30	NA	1,800 N	NA	No	BSL

#### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 Value is for acenaphthene.
- 10 Value is for pyrene.
- Value is for chlordane.
- 12 Value is for hexavalent chromium.
- 13 Value is for mercuric chloride (and other mercury salts).
- 14 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Associated Samples**

DSY-S-MW02-SS01

DSY-S-MW03-0 501

DSY-S-MW04-SS01

DSY-S-MW11-0001

DSY-S-MW12-SS01

DSY-SB-11-0002

DSY-SB204-SO-0002

DSY-SB204-SO-0002-D

DSY-SB205-SO-0002 DSY-SB206-SO-0002

DSY-SB206-SO-0002 DSY-SB207-SO-0002

DSY-S8207-SO-001

DSY-S-TP16-0001

DSY-S-TP18-0001-D

DSY-S-TP19-0001

DSY-S-TP20-0001

DSY-S-TP21-0001

DSY-S-TP22-0001

DSY-S-TP23-0001

DSY-S-TP27-0001

DSY-S-TP28-0001

### Definitions:

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

#### Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels
BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

## TABLE 2.2 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Subsurface Soil Exposure Medium: Subsurface Soil PAGE 1 OF 2

Waterfront  1  See	78-93-3 67-64-1 75-15-0 108-88-3 540-59-0 1330-20-7 79-01-6 Semivolatile 83-32-9 208-96-8 120-12-7 56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 118-01-9	anic Compounds  2-Butanone Acetone Carbon Disulfide Toluene Total 1,2-Dichloroethene Total 1,2-Dichloroethene Trichloroethene Organic Compounds Acenaphthylene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(g,h;)perylene Benzo(g,h;)perylene Benzo(g,h;)perylene Benzo(g,h;)perylene Benzo(g,h;)perylene Benzo(g,h;)perylene Benzo(g,h;)perylene	14 16 2 J 2 J 1 J 2 J 1 J 3.62 J 3.53 J 8 27 J 23.3 2.65 J 2.51 J	14 240 2.6 J 2 J 5 J 2 J 4 J 3.62 J 3.53 J 8 53 J 44 J	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg	DSY-S-TP24-0102 DSY-S-MW11-2931 DSY-SB205-S0-088.5 DSY-S-TP24-0102 DSY-S-MW11-2931-D DSY-S-MW11-2931-D DSY-S-MW11-2931-D DSY-S-MW11-2931-D DSY-S-MW11-2931-D DSY-S-B205-S0-088.5 DSY-SB205-S0-088.5	1/21 3/21 2/21 1/21 1/21 2/21 4/21	4.32 - 110 8.63 - 270 2.16 - 110 2.16 - 110 2.16 - 110 6.47 - 110	14 240 2.6 2 5	NA NA NA NA NA	2,800,000 N 6,100,000 N 82,000 N 500,000 N 70,000 N 63,000 N	10,000,000 7,800,000 NA 190,000 630,000 110,000	No No No No No No	BSL BSL BSL BSL BSL
See	67-64-1 75-15-0 108-88-3 540-59-0 1330-20-7 79-01-6 Semivolatile 83-32-9 208-98-8 120-12-7 56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Acetone Carbon Disulfide Toluene Total 1,2-Dichloroethene Total Xylenes Trichloroethene Organic Compounds Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(g,h,i)perylene Benzo(g,hi)fluoranthene	16 2 J 2 J 1 J 2 J 1 J 3.62 J 3.53 J 8 27 J 23.3 2.65 J	240 2.6 J 2 J 5 J 2 J 4 J 3.62 J 3.53 J 8	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg	DSY-S-MW11-2931 DSY-SB205-SO-088.5 DSY-S-TPZ4-0102 DSY-S-MW11-2931-D DSY-S-MW11-0103, DSY-S-TPZ4-0102 DSY-S-MW11-2931, DSY-S-MW11-2931-D DSY-S-MW11-2931-D	3/21 2/21 1/21 1/21 2/21 4/21	8.63 - 270 2.16 - 110 2.16 - 110 2.16 - 110 6.47 - 110	240 2.6 2 5	NA NA NA NA NA	6,100,000 N 82,000 N 500,000 N 70,000 N 63,000 N	7,800,000 NA 190,000 630,000 110,000	No No No No No	BSL BSL BSL BSL BSL
See	75-15-0 108-88-3 540-59-0 1330-20-7 79-01-6 Semirolatile 83-32-9 208-96-8 120-12-7 56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Carbon Disulfide Toluene Total 1,2-Dichloroethene Total 1,2-Dichloroethene Total Xylenes Trichloroethene Organic Compounds Acenaphthene Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(g,h,i)perylene Benzo(g,h,i)fluoranthene	2 J 2 J 1 J 2 J 1 J 3.62 J 3.53 J 8 27 J 23.3 2.65 J	2.6 J 2 J 5 J 2 J 4 J 3.62 J 3.53 J 8	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg	DSY-SB205-SO-088.5 DSY-S-TP24-0102 DSY-S-MW11-2931-D DSY-S-WW11-0103, DSY-S-TP24-0102 DSY-S-MW11-2931, DSY-S-MW11-2931-D DSY-SB205-SO-088.5	2/21 1/21 1/21 2/21 4/21	2.16 - 110 2.16 - 110 2.16 - 110 6.47 - 110	2.6 2 5 2	NA NA NA	82,000 N 500,000 N 70,000 N 63,000 N	NA 190,000 630,000 110,000	No No No No	BSL BSL BSL BSL
Se	108-88-3 540-59-0 1330-20-7 79-01-6 Semivolatile 83-32-9 208-96-8 120-12-7 56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Toluene Total 1,2-Dichloroethene Total Xylenes Trichloroethene Organic Compounds Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(g,hi)perylene Benzo(g,hi)fluoranthene	2 J 1 J 2 J 1 J 3.62 J 3.53 J 8 27 J 23.3 2.65 J	2 J 5 J 2 J 4 J 3.62 J 3.53 J 8	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg	DSY-S-TP24-0102 DSY-S-MW11-2931-D DSY-S-MW11-0103, DSY-S-TP24-0102 DSY-S-MW11-2931, DSY-S-MW11-2931-D DSY-SB205-SO-088.5	1/21 1/21 2/21 4/21	2.16 - 110 2.16 - 110 6.47 - 110	2 5 2	NA NA NA	500,000 N 70,000 N 63,000 N	190,000 630,000 110,000	No No No	BSL BSL BSL
See	540-59-0 1330-20-7 79-01-6 Semivolatile 83-32-9 208-96-8 120-12-7 56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Total 1,2-Dichloroethene Total Xylenes Trichloroethene Organic Compounds Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(g,h,i)fluoranthene	1 J 2 J 1 J 3.62 J 3.53 J 8 27 J 23.3 2.65 J	5 J 2 J 4 J 3.62 J 3.53 J 8 53 J	ug/kg ug/kg ug/kg ug/kg ug/kg	DSY-S-MW11-2931-D DSY-S-MW11-0103, DSY-S-TP24-0102 DSY-S-MW11-2931, DSY-S-MW11-2931-D	1/21 2/21 4/21	2.16 - 110 6.47 - 110	5	NA NA	70,000 N 63,000 N	630,000 110,000	No No	BSL BSL
Se Se	1330-20-7 79-01-6 Semivolatile 83-32-9 208-96-8 120-12-7 56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Total Xylenes  Trichloroethene  Organic Compounds  Acenaphthene  Acenaphthylene  Anthracene  Benzo(a)anthracene  Benzo(b)fluoranthene  Benzo(g,h,i)perylene  Benzo(g,h,i)fluoranthene	2 J 1 J 3.62 J 3.53 J 8 27 J 23.3 2.65 J	2 J 4 J 3.62 J 3.53 J 8 53 J	ug/kg ug/kg ug/kg ug/kg	DSY-S-MW11-0103, DSY-S-TP24-0102 DSY-S-MW11-2931, DSY-S-MW11-2931-D	2/21 4/21	6.47 - 110	2	NA	63,000 N	110,000	No	BSL
Se	83-32-9 208-96-8 120-12-7 56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	a Organic Compounds Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(g,hi)fluoranthene	3.62 J 3.53 J 8 27 J 23.3 2.65 J	3.62 J 3.53 J 8 53 J	ug/kg ug/kg	DSY-S-MW11-2931, DSY-S-MW11-2931-D DSY-SB205-SO-088.5		2.16 - 110	4	NA	440 N(B)	13 000	No	
Pe	83-32-9 208-96-8 120-12-7 56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Acenaphthene Acenaphthylene Anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene	3.53 J 8 27 J 23.3 2.65 J	3.53 J 8 53 J	ug/kg	DSY-SB205-SO-088.5	1/21	·			, , , , ,	, 0,000		BSL
Pe	83-32-9 208-96-8 120-12-7 56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Acenaphthene Acenaphthylene Anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene	3.53 J 8 27 J 23.3 2.65 J	3.53 J 8 53 J	ug/kg		1/21			l .		L		
Pe	208-96-8 120-12-7 56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Acenaphthylene Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(g,h,i)fluoranthene	3.53 J 8 27 J 23.3 2.65 J	3.53 J 8 53 J	ug/kg			3.42 - 11000	3.62	NA	340,000 N	43.000	No	BSL
Pe	120-12-7 56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene	8 27 J 23.3 2.65 J	8 53 J			1/21	3.42 - 11000	3.53	NA NA	340,000 N <sup>(9)</sup>	23,000	No	BSL
Pe	56-55-3 50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene	27 J 23.3 2.65 J	53 J		DSY-SB205-SO-088.5	1/21	3.42 - 11000	8	NA NA	1.700.000 N	35,000	No	BSL
Pe	50-32-8 205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene	23.3 2.65 J		ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	53	NA	150 C	900	No	BSL
Pe	205-99-2 191-24-2 207-08-9 117-81-7 218-01-9	Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene	2.65 J		ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA NA	15 C	400	Yes	ASL
Pe	191-24-2 207-08-9 117-81-7 218-01-9	Benzo(g,h,i)perylene Benzo(k)fluoranthene		71 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	71	NA NA	150 C	900	No	BSL
Pe	207-08-9 117-81-7 218-01-9	Benzo(k)fluoranthene		21.6	ug/kg	DSY-SB205-SO-088.5	2/21	3.42 - 11000	21.6	NA NA	170,000 N <sup>(10)</sup>	800	No	BSL
Pe	117-81-7 218-01-9		11.2	11.2	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	11.2	NA	1,500 C	900	No	BSL
Pe	218-01-9		43 J	97 J	ug/kg	DSY-S-TP24-0102	5/17	330 - 11000	97	NA .	35,000 C	46,000	No	BSL
Pe	F0 70 0	Chrysene	32.1	44 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA	15,000 C	400	No	BSL
Pe	53-70-3	Dibenzo(a,h)anthracene	23.3	23.3	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	23.3	. NA	15 C	400	Yes	ASL
Pe	84-74-2	di-n-Butyl Phthalate	42 J	270 J	ug/kg	DSY-S-MW04-1618	3/17	330 - 11000	270	NA	610,000 N	NA	No	BSL
Pe	206-44-0	Fluoranthene	2.19 J	81 J	ug/kg	DSY-S-TP24-0102-D	4/21	3.42 - 11000	81	NA NA	230,000 N	20,000	No	BSL
Pe	86-73-7	Fluorene	2.93 J	2.93 J	ug/kg	D\$Y-\$B205-SO-088.5	1/21	3.42 - 11000	2.93	NA	230,000 N	28,000	No	BSL
Pe	193-39-5	Indeno(1,2,3-cd)pyrene	18	18	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	18	NA .	150 C	900	No	BSL
Pe	91-20-3	Naphthalene	3.54 J	3.54 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.54	NA NA	3,600 C	54,000	No	BSL
Pe	85-01-8	Phenanthrene	2.1 J	54 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	54	NA	170,000 N <sup>(10)</sup>	40,000	No	BSL
	129-00-0	Pyrene	2.05 J	1,600 J	ug/kg	DSY-S-TP16-1112	4/21	3.42 - 420	1,600	NÁ	170,000 N	13,000	No	BSL
	Pesticides/F	PCBs												
	309-00-2	Aldrin	4.4 J	4.4 J	ug/kg	DSY-S-TP16-1112	1/17	1.7 - 2.2	4.4	NA NA	29 C	NA	No	BSL
5	5103-71-9	alpha-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA NA	1,600 C <sup>(11)</sup>	NA	No	BSL
	72-20-8	Endrin	15	15	ug/kg	DSY-S-TP16-1112	1/15	3.4 - 3.9	15	NA	1,800 N	NA	No	BSL
- 5	5103-74-2	gamma-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA	1,600 C <sup>(11)</sup>	NA	No	BSL
	76-44-8	Heptachlor	2.4	3.8	ug/kg	DSY-S-MW02-2426	4/17	1.7 - 2.2	3.8	NA NA	110 C	NA	No	BSL
	Vietals				-3-3						•			
		Aluminum	2,430 J	18,200	mg/kg	DSY-S-MW02-3436	39/39	-	18,200	13075	7,700 N	NA	Yes	ASL
		Arsenic	2.7 J	16.6	mg/kg	DSY-S-TP16-1112	37/39	4.1 - 4.7	16.6	20	0.39 C	7	No	BKG
<u> </u>	7440-39-3	Barium	3.2	26.2 J	mg/kg	DSY-S-TP28-1314	26/39	2.1 - 6	26.2	36	1,500 N	5,500	No	BSL, BKG
7	7440-41-7	Beryllium	0.176 J	0.35 J	mg/kg	DSY-S-TP22-1112, DSY- S-TP28-0507, DSY-S- TP28-1314	22/39	0.18 - 0.26	0.35	0.64	16 N	1.5	No	BSL, BKG
<del>  7</del>	7440-43-9	Cadmium	0.65 J	0.65 J	mg/kg	DSY-S-TP22-1112	1/39	0.106 - 1.1	0.65	0.23	7 N	39	No	BSL
—			305	3,480	mg/kg	DSY-S-MW02-1820	39/39	-	3,480	1689	NA	NA NA	No	NUT
<u> </u>		Chromium	2.2 J	27.1 J	mg/kg	DSY-S-MW02-3436	37/39	6 - 7.8	27.1	18	0.29 C <sup>(12)</sup>	390 <sup>(12)</sup>	Yes	ASL
	7440-48-4		3 J	19.8	mg/kg	DSY-S-MW02-3436	33/39	2.6 - 3.2	19.8	17	2.3 N	NA NA	Yes	ASL
	7440-50-8		4.1 J	30.9	mg/kg	DSY-S-MW02-3436	36/39	4.1 - 5	30.9	24	310 N	3,100	No	BSL
			6.970	44,400 J	mg/kg	DSY-S-MW11-2931	39/39		44,400	39173	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	1.6 J	29.2	mg/kg	D\$Y-S-MW03-1618	38/39	1.7 - 1.7	29.2	12	400	150	No	BSL
			921	7.680	mg/kg	DSY-S-MW02-3436	39/39	-	7,680	3811	NA	NA	No	NUT
_		Manganese	55.4	549 J	mg/kg	DSY-S-TP22-1112	39/39		549	1037	180 N	390	No	BKG
_		Mercury	0.0125 J	0.31	mg/kg	DSY-S-MW11-2931	4/39	0.03 - 0.18	0.31	0.012	2.3 N <sup>(13)</sup>	23	No	BSL
		Nickel	5.1	39.5	mg/kg	DSY-S-MW02-3436	37/39	14.1 - 15.7	39.5	28	150 N	1,000	No	BSL
	7439-97-6	Potassium	132	1,190	mg/kg	DSY-S-MW12-SS12	39/39	17.1 - 13.7	1,190	1700	NA NA	NA NA	No	NUT, BKG
H	7439-97-6 7440-02-0		0.16 J	1,190 1.3 J	mg/kg	DSY-S-MW12-SS16	9/36	· -	1.3	0.29	39 N	1 11/0	No	BSL

### TABLE 2.2

### OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Subsurface Soil

Exposure Medium: Subsurface Soil

PAGE 2 OF 2

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
	Metals (Continued)													
	7440-23-5	Sodium	23	117	mg/kg	DSY-S-TP20-1011	3/38	16.8 - 330	117	83	NA	NA	No	NUT
	7440-62-2	Vanadium	4.3	23.9 J	mg/kg	DSY-S-MW11-2931	39/39	-	23.9	23	39 N	550	No	BSL
	7440-66-6	Zinc	13.6 J	74.9	mg/kg	DSY-S-MW11-2931	39/39	-	74.9	66	2,300 N	6,000	No	BSL
1	Miscellaneous Parameters													
1	1461-25-2	Tetrabutyltin	3.3 J	8.5 J	ug/kg	DSY-S-TP24-0102-D	3/17	49 - 50	8.5	NA	1,800 N <sup>(14)</sup>	NA	No	BSL
1	56573-85-4	Tributyltin	1.4 J	15.1 J	ug/kg	DSY-S-MW11-2931	5/17	49 - 50	15.1	NA	1,800 N	NA	No	B\$L

#### Footnotes

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011,
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 Value is for acenaphthene.
- 10 Value is for pyrene.
- 11 Value is for chlordane.
- 12 Value is for hexavalent chromium.
- 13 Value is for mercuric chloride (and other mercury salts).
- 14 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### Associated Samples

DSY-S-MW02-1820	DSY-S-TP16-1112
DSY-S-MW02-2426	DSY-S-TP18-0507
DSY-S-MW02-3436	DSY-S-TP18-1011
DSY-S-MW03-0810	DSY-S-TP19-0507
DSY-S-MW03-1618	DSY-S-TP19-1011
DSY-S-MW04-0810	DSY-S-TP20-0507
DSY-S-MW04-1618	DSY-S-TP20-1011
DSY-S-MW11-0103	DSY-S-TP21-0507
D\$Y-S-MW11-1113	DSY-S-TP21-1011
DSY-S-MW11-1113-D	DSY-S-TP22-0506
DSY-S-MW11-2729	DSY-S-TP22-1112
DSY-S-MW11-2931	DSY-S-TP23-0507
DSY-S-MW11-2931-D	DSY-S-TP23-0910
DSY-S-MW12-SS05	DSY-S-TP24-0102
DSY-S-MW12-SS12	DSY-S-TP24-0102-D
DSY-S-MW12-SS16	DSY-S-TP24-0507
DSY-SB204-SO-0810	DSY-S-TP24-1011
DSY-SB205-SO-088.5	DSY-S-TP27-0507
DSY-SB206-SO-0810	DSY-S-TP27-1011
DSY-SB207-SO-1012	DSY-S-TP28-0507
DSY-S-TP16-0506	DSY-S-TP28-1314

### Definitions:

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

#### Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels
BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

## TABLE 2.3 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Groundwater Exposure Medium: Groundwater PAGE 1 OF 2

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(8)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
North Waterfront	67-64-1	Acetone	10 J	10 J	ug/L	DSY-A-MW03-01	1/14	5 - 40	10	NA	1,200 N	NA NA	NA NA	No	BSL
	156-59-2	cis-1,2-Dichloroethene	0.284 J	4.26	ug/L	DSY-GW-MW220-030111	5/9	0.5 - 0.5	4.26	NA	2.8 N	70 70	EPA-MCL RIDEM	Yes	ASL
	127-18-4	Tetrachloroethene	0.696 J	0.696 J	ug/L	DSY-GW-MW03-022411	1/14	0.5 - 10	0.696	NA NA	3.5 N <sup>(7)</sup>	5 5	EPA-MCL RIDEM	No	BSL
	156-60-5	trans-1,2-Dichloroethene	0.669 J	4.81	ug/L	DSY-GW-MW12-030311	3/9	0.5 - 0.5	4.81	NA	8.6 N	100	EPA-MCL RIDEM	No	BSL
	79-01-6	Trichloroethene	3.16	33	ug/L	DSY-A-MW03-01-D	8/14	0.5 - 10	33	NA NA	0.26 N <sup>(7)</sup>	5 5	EPA-MCL RIDEM	Yes	ASL
	75-01-4	Vinyl Chloride	1.47	1.47	ug/L	DSY-GW-MW220-030111	1/14	0.5 - 10	1.47	NA NA	0.015 C	2	EPA-MCL RIDEM	Yes	ASL
	Metals (Total	al)						·	·		l		•		
	7429-90-5	Aluminum	337	337	ug/L	DSY-GW-MW204-031711	1/6	43.9 - 227	337	NA	1,600 N	50 - 200 NA	EPA-SDWR NA		
	7440-38-2	Arsenic	4.3 J	13.2	ug/L	DSY-A-MW11-01	3/6	1.5 - 4	13.2	NA NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
	7440-39-3	Barium	11.6	44.4	ug/L	DSY-A-MW02-01	3/6	10.4 - 33.5	44.4	NA NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
	7440-70-2	Calcium	22,000 J	80,200	ug/L	DSY-A-MW04-01	6/6	-	80,200	NA	NA	NA NA	NA NA	No	NUT
	7440-47-3	Chromium	0.508 J	7.3 J	ug/L	DSY-A-MW11-01	2/6	6 - 6	7.3	NA	0.031 C	100 100	EPA-MCL RIDEM	Yes	ASL
	7440-50-8	Copper	5.4 J	5.8 J	ug/L	DSY-A-MW03-01-D	1/6	2 - 5	5.8	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
	7439-89-6	Iron	78.3 J	605 J	ug/L	DSY-GW-MW204-031711	3/6	134 - 216	605	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
	7439-95-4	Magnesium	6,700 J	31,600	ug/L	DSY-A-MW02-01	6/6	-	31,600	NA	NA	NA NA	NA NA	No	NUT
	7439-96-5	Manganese	30	373	ug/L `	DSY-A-MW11-01	6/6	19.9 - 19.9	373	NA NA	32 N	50 NA	EPA-SDWR NA	Yes	ASL
	7440-02-0	Nickel	3.38	11,4 J	ug/L	DSY-A-MW03-01-D	2/6	9 - 9	11.4	NA NA	30 N	NA 100	NA RIDEM	No	BSL
	7440-09-7	Potassium	1,660	17,100	ug/L	DSY-A-MW02-01	6/6	-	17,100	NA NA	NA	NA NA	NA NA	No	NUT
	7440-23-5	Sodium	29,700	200,000	ug/L	DSY-A-MW02-01	6/6	-	200,000	NA	NA	NA NA	NA NA	No	NUT
	7440-66-6	Zinc	6.65	68.3	ug/L	DSY-A-MW02-01	4/6	15.2 - 17.3	68.3	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
	7429-90-5	Aluminum	72	72	ug/L	DSY-GW-MW204-031711	1/1	-	72	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	Yes	ASL
	7440-39-3	Barium	11.5	11.5	ug/L	DSY-GW-MW204-031711	171	-	11.5	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
	Dissolved B	Metals (Continued)			-	J	1	1	<u> </u>		I	2,000	NIDEN		<u> </u>
	7440-70-2		30,800 J	30,800 J	ug/L	DSY-GW-MW204-031711	1/1		30,800	NA NA	NA	NA NA	NA NA	No	NUT
	7440-50-8	Copper	1.19 J	1.19 J	ug/L	DSY-GW-MW204-031711	1/1	-	1.19	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
	7439-89-6	Iron	50.5 J	50.5 J	ug/L	DSY-GW-MW204-031711	1/1		50.5	NA	1,100 N	300 NA	EPA-SDWR NA	No	BSL
	7439-95-4	Magnesium	7,450 J	7,450 J	ug/L	DSY-GW-MW204-031711	1/1	-	7,450	NA	NA	NA NA	NA NA	No	NUT
	7439-96-5	Manganese	53.3	53.3	ug/L	DSY-GW-MW204-031711	1/1	-	53.3	NA	32 N	50 NA	EPA-SOWR	Yes	ÁŠL
	7440-02-0	Nickel	3.39	3.39	ug/L <sub>.</sub>	DSY-GW-MW204-031711	1/1	-	3.39	NA NA	30 N	NA 100	NA RIDEM	No	BSL

### TABLE 2.3 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD

NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Current/Future Medium: Groundwater Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Meximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(8)</sup>
i .	Metals (Diss	iolved)													
	7440-09-7	Potassium	1,770	1,770	ug/L	DSY-GW-MW204-031711	1/1	-	1,770	NA	NA	NA	NA NA	No	NUT
			l			Į				l e		NA	NA NA		
	7440-23-5	Sodium	42,300	42,300	ug/L	DSY-GW-MW204-031711	1/1	-	42,300	NA	NA	NA	NA NA	No	NUT
			i		_							NA	NA NA		
ţ	7440-66-6	Zinc	6.48	6.48	ug/L	DSY-GW-MW204-031711	1/1	-	6.48	NA	470 N	5,000	EPA-SDWR	No	BSL
	1								Į			NA	NA	1	j

### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented. Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Associated Samples**

DSY-GW-MW02A-022411 DSY-GW-MW03-022411 DSY-GW-MW11A-022611

DSY-GW-MW11A-022611-D

DSY-GW-MW12-030311

DSY-GW-MW204-031711

DSY-GW-MW220-030111

DSY-GW-MW221-030211

DSY-GW-MW222-030211

DSY-GW-MW223-031611

DSY-A-MW02-01 DSY-A-MW03-01

DSY-A-MW03-01-D

DSY-A-MW04-01

DSY-A-MW11-01 DSY-A-MW12-01

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

CAS = Chemical Abstracts Service

COPC = Chemical Of Potential Concern

EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)

EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

RIDEM = Rhode Island Department of Environmental Management GA Groundwater Objective (November, 2011).

Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:

BSL = Below COPC Screening Level

NTX = No toxicity criteria

## TABLE 2.4 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - NORTH WATERFRONT FORMER ROBERT & DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, HODE ISLAND

Scenario Timeframe: Current/Future Medium: Groundwater Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Vapor Intrusion Criteria <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
North	Volatile Org	janic Compounds										,			
Waterfront	67-64-1	Acetone	10 J	10 J	ug/L	DSY-A-MW03-01	1/14	5 - 40	10	NA NA	2,300,000 N	NA	NA	No	BSL
	156-59-2	cis-1,2-Dichloroethene	0.284 J	4.26	ug/L	DSY-GW-MW220-030111	5/9	0.5 - 0.5	4.26	NA	NA	NA	NA NA	No	NTX
	127-18-4	Tetrachloroethene	0.696 J	0.696 J	ug/L	DSY-GW-MW03-022411	1/14	0.5 - 10	0.696	NA	5.8 N <sup>(7)</sup> _	NA	NA	No	BSL
	156-60-5	trans-1,2-Dichloroethene	0.669 J	4.81	ug/L	DSY-GW-MW12-030311	3/9	0.5 - 0.5	4.81	NA	38 N	NA	NA	No.	BSL
	79-01-6	Trichloroethene	3.16	33	ua/L	DSY-A-MW03-01-D	8/14	0.5 - 10	33	NA	0.52 N <sup>(7)</sup>	NA	NA	Yes	ASL
	75-01-4	Vinyl Chloride	1.47	1.47	ug/L	DSY-GW-MW220-030111	1/14	0.5 - 10	1.47	NA	0.14 C	NA	NA	Yes	ASL
	Metals														
	7429-90-5	Aluminum	337	337	ug/L	DSY-GW-MW204-031711	1/6	43.9 - 227	337	NA	NA	NA	NA.	No	NTX
1	7440-38-2	Arsenic	4.3 J	13.2	ug/L	DSY-A-MW11-01	3/6	1.5 - 4	13.2	NA NA	NA	NA	NA	No	NTX
	7440-39-3	Barium	11.6	44.4	ug/L	DSY-A-MW02-01	3/6	10.4 - 33.5	44.4	NA NA	NA NA	NA .	NA	No	NTX
	7440-70-2	Calcium	22,000 J	80,200	ug/L	DSY-A-MW04-01	6/6	-	80,200	NA NA	NA .	NA NA	NA	No	NUT
1	7440-47-3	Chromium	0.508 J	7.3 J	ug/L	DSY-A-MW11-01	2/6	6 - 6	7.3	NA NA	NA NA	NA	NA	No	NTX
1	7440-50-8	Copper	5.4 J	5.8 J	ug/L	DSY-A-MW03-01-D	1/6	2 - 5	5.8	NA NA	NA .	NA.	NA	No	NTX
	7439-89-6	Iron	78.3 J	605 J	ug/L	DSY-GW-MW204-031711	3/6	134 - 216	605	NA NA	NA	NA	NA	No	NTX
	7439-95-4	Magnesium	6,700 J	31,600	ug/L	DSY-A-MW02-01	6/6	-	31,600	NA	NA .	NA NA	NA	No	NUT
i	7439-96-5	Manganese	30	373	ug/L	DSY-A-MW11-01	6/6	19.9 - 19.9	373	NA	NA NA	NA	NA	No	NTX
	7440-02-0	Nickel	3.38	11.4 J	ug/L	DSY-A-MW03-01-D	2/6	9-9	11.4	NA	NA NA	NA NA	NA	No	NTX
	7440-09-7	Potassium	1,660	17,100	ug/L	DSY-A-MW02-01	6/6		17,100	NA	NA NA	NA	NA	No	NUT
	7440-23-5	Sodium	29,700	200,000	ug/L	DSY-A-MW02-01	6/6	-	200,000	NA	NA NA	NA NA	NA	No	NUT
	7440-66-6	Zinc	6.65	68.3	ug/L	DSY-A-MW02-01	4/6	15.2 - 17.3	68.3	NA	NA NA	NA NA	NA NA	No	NTX
ì	Dissolved N	Metals													•
	7429-90-5		72	72	ug/L	DSY-GW-MW204-031711	1/1	<u> </u>	72	NA NA	NA NA	NA NA	NA	No	NTX
	7440-39-3		11.5	11.5	ug/L	DSY-GW-MW204-031711	1/1	-	11.5	NA NA	NA NA	NA NA	NA	No	NTX
j	7440-70-2	Calcium	30,800 J	30,800 J	ug/L	DSY-GW-MW204-031711	1/1	·	30,800	NA	NA NA	NA	NA	No	NUT
	7440-50-8	Copper	1.19 J	1.19 J	ug/L	DSY-GW-MW204-031711	1/1	-	1.19	NA	NA_	NA	NA	No	NTX
	7439-89-6	Iron	50.5 J	50.5 J	ug/L	DSY-GW-MW204-031711	1/1	<del>.</del>	50.5	NA NA	NA	NA NA	NA	No	NTX
l	7439-95-4	Magnesium	7,450 J	7,450 J	ug/L	DSY-GW-MW204-031711	1/1	-	7,450	NA	NA	NA	NA	No	NUT
1	7439-96-5	Manganese	53.3	53.3	ug/L	DSY-GW-MW204-031711	1/1		53.3	NA NA	NA NA	NA	NA	No	NTX
	7440-02-0	Nickel	3.39	3.39	ug/L	DSY-GW-MW204-031711	1/1		3.39	NA NA	NA	NA	NA	No_	NTX
	7440-09-7	Potassium	1,770	1,770	ug/L	DSY-GW-MW204-031711	1/1	~	1,770	NA	NA	NA	NA	No	NUT
	7440-23-5	Sodium	42,300	42,300	ug/L	DSY-GW-MW204-031711	1/1	-	42,300	NA NA	NA .	NA NA	NA	No	NUT
1	7440-66-6		6.48	6.48	ug/L	DSY-GW-MW204-031711	1/1	-	6.48	NA NA	NA	NA	NA	No	NTX

### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
  Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Associated Samples**

DSY-GW-MW220-030111 DSY-GW-MW02A-022411 DSY-GW-MW03-022411 DSY-GW-MW221-030211 DSY-GW-MW11A-022611 DSY-GW-MW222-030211 DSY-GW-MW11A-022611-D DSY-GW-MW223-031611 DSY-A-MW03-01-D DSY-GW-MW12-030311 DSY-A-MW04-01 DSY-GW-MW204-031711 DSY-A-MW02-01 DSY-A-MW11-01 DSY-A-MW12-01 DSY-A-MW03-01

### Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

CAS = Chemical Abstracts Service

COPC = Chemical Of Potential Concern

J = Estimated value

NA = Not Applicable/Not Available

### Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BSL = Below COPC Screening Level NTX = No toxicity criteria

NUT = Essential nutrient

NVT = Not sufficiently volatile and/or toxic to pose inhalation risk.

# TABLE 2.5 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL GAS - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Medium: Soil Gas Exposure Medium: Soil Gas

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Range of Background Concentrations <sup>(4)</sup>	Screening Toxicity Value <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
North	Volatile Org	anic Compounds		·····			•	•							
Waterfront	71-55-6	1,1,1-Trichloroethane	0.055 J	0.26	ug/m³	DSY-SG-MW03-0608, DSY-SG-MW03-0608-D	4/4	-	0.26	NA	5,200 N	NA	NA	No	BSL
)	76-13-1	1,1,2-Trichlorotrifluoroethane	0.5 J	0.79 J	ug/m³	DSY-SG-MW02A-0708	4/4	-	0.79	NA	31,000 N	NA	NA	No	BSL
1	75-34-3	1,1-Dichloroethane	0.076 J	0.25	ug/m³	DSY-SG-MW02A-0708	4/4	-	0.25	NA	15 C	NA	NA_	No	BSL
	95-63-6	1,2,4-Trimethylbenzene	0.38 J	2.4 J	ug/m³	DSY-SG-MW03-0608	4/4	0.35 - 0.35	2.4	NA .	7.3 N	NA	NA	No	BSL
	108-67-8	1,3,5-Trimethylbenzene	0.3 J	1.1	ug/m³	DSY-SG-MW03-0608	2/4	0.34 - 0.39	1.1	NA	7.3 N <sup>(6)</sup>	NA	NA	No .	BSL
	106-99-0	1,3-Butadiene	2.3	, 13	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	4/4	-	13	NA	0.81 C	NA	NA	Yes	ASL
	622-96-8	1-Ethyl-4-Methyl Benzene	0.36 J	1.5 J	ug/m <sup>3</sup>	DSY-SG-MW03-0608	4/4	0.35 - 0.35	1.5	NA	NA	NA	NA	No	NTX
	78-93-3	2-Butanone	3.3	17	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	4/4	-	17	NA.	5,200 N	NA	NA	No	BSL
	591-78-6	2-Hexanone	0.28 J	1 J	ug/m³	DSY-SG-MW12-0506	3/4	1.1 - 1.1	1	NA	31 N	NA	NA NA	No	BSL
	108-10-1	4-Methyl-2-Pentanone	0.21 J	0.97	ug/m³	DSY-SG-MW12-0506	4/4	-	0.97	NA	3,100 N	NA	NA NA	No.	BSL
	107-13-1	Acrylonitrile	2.8	2.8	ug/m³	DSY-SG-MW11A-0203	1/4	1.4 - 1.8	2.8	NA NA	0.36 C	NA	NA	Yes	ASL
	71-43-2	Benzene	0.67	6.8	ug/m³	DSY-SG-MW11A-0203	4/4		6.8	NA	3.1 C	NA	NA	Yes	ASL
	108-90-7	Chlorobenzene	0.17 J	0.3 J	ug/m³	DSY-SG-MW11A-0203	2/4	0.31 - 0.32	0.3	NA	52 N	NA NA	NA	No	BSL
	75-00-3	Chloroethane	0.6 J	1.3 J	ug/m³	DSY-SG-MW11A-0203	2/4	0.17 - 0.18	1.3	NA	10,000 N	NA	NA	No	BSL
	67-66-3	Chloroform	0.14 J	0.7 J	ug/m³	DSY-SG-MW11A-0203	4/4		0.7	NA	1.1 C	NA.	NA	No	BSL
	74-87-3	Chloromethane	1.3	4.9	ug/m³	DSY-SG-MW11A-0203	2/4	0.13 - 0.14	4.9	NA	94 N	NA	NA	No	BSL
	156-59-2	cis-1,2-Dichloroethene	0.062 J	27	ug/m³	DSY-SG-MW11A-0203	3/4	0.014 - 0.017	27	NA	63 N <sup>(7)</sup>	NA	NA	No	BSL
	110-82-7	Cyclohexane	0.3 J	1.8	ug/m³	DSY-SG-MW02A-0708	3/4	0.24 - 0.24	1.8	NA	6,300 N	NA	NA NA	No	BSL
	75-71-8	Dichlorodifluoromethane	2	3	ug/m³	DSY-SG-MW03-0608, DSY-SG-MW03-0608-D	4/4	-	3	NA	100 N	NA	NA	No	BSL
	100-41-4	Ethylbenzene	0.13 J	1.1	ug/m³	DSY-SG-MW02A-0708	4/4	-	1.1	NA NA	9.7 C	NA	NA	No	BSL
	110-54-3	Hexane	1.7	4.8	ug/m³	DSY-SG-MW02A-0708	4/4	-	4.8	NA	730 N	NA	NA	No	BSL
		m+p-Xylenes	0.15 J	1.7	ug/m <sup>3</sup>	DSY-SG-MW12-0506	4/4	-	1.7	NA	100 N <sup>(8)</sup>	NA	NA	No	BSL
ı	1634-04-4	Methyl Tert-Butyl Ether	0.0085 J	0.015 J	ug/m³	DSY-SG-MW12-0506	2/4	0.014 - 0.016	0.015	NA	94 C	NA	NA	No	BSL
	75-09-2	Methylene Chloride	0.65 J	1.5	ug/m <sup>3</sup>	DSY-SG-MW03-0608	3/4	0.23 - 0.23	1.5	NA	630 N <sup>(9)</sup>	NΑ	NA	No	BSL
İ	142-82-5	n-Heptane	0.47 J	2.7	ug/m³	DSY-SG-MW12-0506	4/4	-	2.7	NA NA	NA	NA	NA	No	NTX
	95-47-6	o-Xylene	0.064 J	0.8	ug/m³	DSY-SG-MW12-0506	4/4		0.8	NA	100 N	NA	NA	No	BSL
	100-42-5	Styrene	0.43 J	0.69	ug/m³	DSY-SG-MW11A-0203	2/4	0.28 - 0.29	0.69	NA	1,000 N	NA	NA	No	BSL
	127-18-4	Tetrachloroethene	1	12	ug/m³	DSY-SG-MW11A-0203	4/4		12	NA	42 N <sup>(9)</sup>	NA	NA	No	BSL
	108-88-3	Toluene	0.67	7.2	ug/m³	DSY-SG-MW02A-0708	4/4		7.2	NA NA	5,200 N	NA NA	NA NA	No	BSL
	540-59-0	Total 1,2-Dichloroethene	0.062 J	31.1	ug/m³	DSY-SG-MW11A-0203	3/4	0.014 - 0.017	31.1	NA NA	63 N <sup>(9)</sup>	NA NA	NA NA	No	BSL
		· '	0.062 J	2.5	ug/m³	DSY-SG-MW12-0506	4/4	0.014 - 0.017	2.5	NA NA	100 N	NA NA	NA NA	No	BSL
	1330-20-7	Total Xylenes				DSY-SG-MW12-0506 DSY-SG-MW11A-0203		0.013 - 0.017		NA NA	63 N	NA NA	NA NA		BSL
	156-60-5	trans-1,2-Dichloroethene	4.1	4.1	ug/m³		1/4	0.013 - 0.017	4.1				<del></del>	No	
	79-01-6_	Trichloroethene	0.088 J	120	ug/m <sup>3</sup>	DSY-SG-MW11A-0203	4/4	ļ :.—	120	NA	2.1 N <sup>(9)</sup>	NA	NA	Yes	ASL
	75-69-4	Trichlorofluoromethane	1.8	7.4	ug/m³	DSY-SG-MW12-0506	4/4	<u> </u>	7.4	NA NA	730 N	NA	NA	No	BSL
	75-01-4	Vinyl Chloride	0.15 J	0.76	ug/m³	DSY-SG-MW02A-0708	4/4	-	0.76	NA NA	1.6 C	NA	NA	No	BSL

## TABLE 2.5 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL GAS - NORTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available.
- 5 USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs. 6 - Value is for 1,2,4-trimethylbenzene.
- 7 Value is for trans-1,2-dichloroethene.
- 8 Value is for m-xylene.
- 9 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Associated Samples**

DSY-SG-MW02A-0708 DSY-SG-MW03-0608

DSY-SG-MW03-0608-D DSY-SG-MW11A-0203

DSY-SG-MW12-0506

### Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

### Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BSL = Below COPC Screening Level

NUT = Essential nutrient

NTX = No toxicity criteria

# TABLE 2.6 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Current/Future Medium: Surface Soil Exposure Medium: Surface Soil

posure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Central	Semivolatile	Organic Compounds												
hipyard	108-60-1	2,2'-Oxybis(1-Chloropropane)	180 J	180 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	180	NA	4,600 C	NA NA	No	BSL
	95-48-7	2-Methylphenol	83 J	83 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400_	83	NA	310,000 N	NA	No	BSL
	106-44-5	4-Methylphenol	500 J	500 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	500	NA NA	610,000 N	NA NA	No	BSL
	83-32-9	Acenaphthene	92 J	92 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	92	NA	340,000 N	43,000	No	BSL
	120-12-7	Anthracene	130 J	130 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	130	NA_	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	140 J	410 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	410	NA	150 C	900	Yes	ASL
	50-32-8	Benzo(a)pyrene	86 J	140 J	ug/kg	DSY-S-TP17-0001	2/6	330 - 400	140	NA NA	15 C	400	Yes	ASL
		Benzo(b)fluoranthene	230 J	410 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	410	NA NA	150 C	900	Yes	ASL
	191-24-2	Benzo(g,h,i)perylene	110 J	130 J	ug/kg	DSY-S-TP17-0001	2/6	330 - 400	130	NA	170,000 N <sup>(8)</sup>	800	No	BSL
	207-08-9	Benzo(k)fluoranthene	360 J	360 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400 330 - 400	360 97	NA NA	1,500 C NA	900 NA	No	BSL NTX
	86-74-8 218-01-9	Carbazole	97 J	97 J 420 J	ug/kg	DSY-S-TP15-0001 DSY-S-TP15-0001	1/6 2/6	330 - 400	420	NA NA	15,000 C	400	No Yes	ASL
	206-44-0	Chrysene	120 J 330 J	870 J	ug/kg ug/kg	DSY-S-TP15-0001	2/6	330 - 400	870	NA NA	230,000 N	20,000	No	BSL
	86-73-7	Fluoranthene Fluorene	65 J	65 J	ug/kg ug/ka	DSY-S-TP15-0001	1/6	330 - 400	65	NA NA	230,000 N	28.000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	140 J	150 J	ug/kg ug/kg	DSY-S-TP15-0001	2/6	330 - 400	150	NA NA	150 C	900	No	BSL
	85-01-8	Phenanthrene	130 J	580 J	ug/kg ug/ka	DSY-S-TP15-0001	2/6	330 - 400	580	NA NA	170.000 N <sup>(8)</sup>	40,000	No	BSL
	108-95-2	Phenol	1,200 J	1,200 J	ug/kg ua/ka	DSY-S-TP17-0001	1/6	330 - 400	1,200	NA NA	1.800.000 N	6.000.000	No	BSL
		Pyrene	300 J	740 J	ug/kg ug/kg	DSY-S-TP17-0001	2/6	330 - 400	740	NA NA	170,000 N	13,000	No	BSL
	Pesticides/F		300 0	7403	ug/kg	D31-3-17 13-0001	2/0	330 - 400	140	110	170,000 14	10,000	1 140	DOL
		4.4'-DDD	4.3	4.3	ug/kg	DSY-S-TP15-0001	1/6	3.3 - 4	4.3	NA	2,000 C	NA NA	No	BSL
		4.4'-DDT	6.2	6.2	ug/kg	DSY-S-TP15-0001	1/6	3.3 - 4	6.2	NA NA	1,700 C	NA NA	No	BSL
		Aroclor-1260	32 J	32 J	ug/kg	DSY-S-TP15-0001	1/6	33 - 40	32	NA NA	220 C	NA NA	No	BSL
	Metals	Pricolor IEGO	02.0	02.0		<u> </u>			<u> </u>			L		
	7429-90-5	Aluminum	5.820	13,200	mg/kg	DSY-S-TP12-0001	6/6	-	13,200	16,020	7,700 N	NA	No	BKG
	7440-38-2	Arsenic	3.9	24.4	mg/kg	DSY-S-TP11-0001	6/6		24.4	13	0.39 C	7	Yes	ASL
	7440-39-3	Barium	12.1	24	mg/kg	DSY-S-TP15-0001	6/6	-	24	51	1,500 N	5,500	No	BSL, BKG
	7440-41-7	Beryllium	0.23 J	0.47	mg/kg	DSY-S-TP15-0001	6/6	-	0.47	0.58	16 N	1.5	No	BSL, BKG
	7440-43-9		0.75 J	1 J	mg/kg	D\$Y-\$-TP15-0001	4/6	0.48 - 0.61	1	0.17	7 N	39	No	BSL
	7440-70-2	Calcium	426 J	1,130 J	mg/kg	DSY-S-MW07-0001	6/6	-	1,130	1,600	NA	NA	No	NUT, BKG
	7440-47-3	Chromium	9.6	18.2	mg/kg	DSY-S-TP12-0001	6/6	-	18.2	16	0.29 C <sup>(9)</sup>	390 <sup>(9)</sup>	Yes	ASL
		Cobalt	7.6 J	14.7	mg/kg	DSY-S-MW07-0001	6/6	-	14.7	9	2.3 N	NA NA	Yes	ASL
	7440-50-8		15.1	31.8	mg/kg	DSY-S-TP12-0001	6/6	-	31.8	12	310 N	3,100	No	BSL
		Iron	18,000	32,500	mg/kg	DSY-S-TP12-0001	6/6	-	32,500	24,200	5,500 N	NA	Yes	ASL
		Lead	5.8 J	27.4	mg/kg	DSY-S-TP15-0001	6/6		27.4	40	400	150	No	BSL, BKG
		Magnesium	2.310	3,970	mg/kg	DSY-S-TP12-0001	6/6	-	3,970	2.571	NA	NA	No	NUT
		Manganese	272	448	mg/kg	DSY-S-MW07-0001	6/6	-	448	349	180 N	390	Yes	ASL
		Mercury	0.12	0.12	ma/ka	DSY-S-MW07-0001	1/6	0.05 - 0.13	0.12	0.18	2.3 N <sup>(10)</sup>	23	No	BSL, BKG
	7440-02-0		14.5	27.1	ma/ka	DSY-S-TP12-0001	6/6		27.1	15	150 N	1.000	No	BSL
		Potassium	241	606	mg/kg	DSY-S-TP17-0001	6/6	l	606	651	NA NA	NA	No	NUT, BKG
		Selenium	0.74 J	1.2	mg/kg	DSY-S-TP15-0001	3/6	0.62 - 0.82	1,2	0.57	39 N	390	No	BSL
	7440-23-5		87.9	87.9	mg/kg	DSY-S-TP17-0001	1/6	22.6 - 69.7	87.9	231	NA NA	NA NA	No	NUT, BKG
	7440-62-2		8.6	21.8 J	mg/kg	DSY-S-TP15-0001	6/6		21.8	34	39 N	550	No	BSL, BKG
	7440-66-6		32.7 J	71	mg/kg	DSY-S-TP15-0001	6/6		71	62	2,300 N	6,000	No	BSL
		ous Parameters	02.70	, , , , , , , , , , , , , , , , , , ,	mgang			L	· · · · · · · · · · · · · · · · · · ·	V-	2,000 11	0,000	, ,,,,	
		Tetrabutyltin	8.8 J	8.8 J	ua/ka	DSY-S-TP15-0001	1/6	49 - 50	8.8	NA NA	1,800 N <sup>(11)</sup>	NA	No	BSL
			8.8 J 4.8 J	8.8 J 4.8 J		DSY-S-TP15-0001	1/6	49 - 50	4.8	NA NA	1,800 N	NA NA	No	BSL
	56573-85-4	T i ributyitin	] 4.8 J	4.8 J	ug/kg_	T D31-5-1F15-0001	1/0	1 49 - 50	4.5	NA	1,500 N	I INA	INO	DOL

## TABLE 2.6 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for pyrene.
- 9 Value is for hexavalent chromium.
- 10 Value is for mercuric chloride (and other mercury salts).
- 11 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### Associated Samples

DSY-S-MW05-SS01

DSY-S-MW05-SS01-D

DSY-S-MW07-0001

DSY-S-TP11-0001 DSY-S-TP12-0001

DSY-S-TP15-0001

DSY-S-TP17-0001

### Definitions:

C = Carcinogen COPC = Chemical Of Potential Concern J = Estimated value N = Noncarcinogen NA = Not Applicable/Not Available

### Rationale Codes:

For selection as a COPC: ASL = Above Screening Level.

For elimination as a COPC: BKG = Within Background Levels BSL = Below COPC Screening Level NTX = No toxicity criteria NUT = Essential nutrient

## TABLE 2.7 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Subsurface Soil Exposure Medium: Subsurface Soil

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Shepper	Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Prof.   Prof	Central				140.5	,,	1 14 050	1 47/05	1 44 440	110	T NA	L 0.100.000 N	7 800 000	Mo	BCI
Fig. 52   Methylene Chicolog	Shipyard														
1998/93   Tolkers															
Sembroal Corporation   1															
Seminositic Organic Compounds   90.57   200.57   300.57															
\$1.576   June				1.J	1.0	_ug/kg	542 SVVIV	1/19	11-13		I NA	03,000 N	110,000	INO	DOL
633-99   Accesspreament				T - FO 1	200.1	ug/kg	DOV C MMOZ 0910	2/10	240 4000	290	I NA	23 000 N	123,000	l No	BSI
269-96-96   Accompletifylene   43															
1921-197   Arthresene								<del></del>						_	
595-55   Besto Optiveries   47 J   1,500   ug/kg   Ni B   1028   500-4000   1,000   NA   18 C   500   Vea   ASL   800-20   1,000   NA   18 C   500   Vea   ASL   800-20   1,000   NA   18 C   500   Vea   ASL   1025-5992   Besto Optiveries   63 J   910   ug/kg   Ni B   11725   360-4000   910   NA   170-60 Ni	]														
20.526   Service Operation															
259.599.2   Bernot Officerantinen															
1911-14-12   Sextor(a, h)pendene															
207.0699   BencefullyContinene							<del></del>		<del></del>						
17.817   98/2-emphray/priminate   93   160   1															
Be-B87   Buth Bertz/Private   49 J															
Care   Care															
S57703   Despress   Institutance	1														
206-44-0   Fluorantheme	1														
B6737   Flucture															
193-39-5															
91:20.3   Naphthelene	l														
BS.0.1   Phenanthrene   37 J   5.200	1					1									
Posticidas/PCBS   Posticidas	1			+					<del></del>				+	_	
Pesticides/PCBs															
T25-58-   4.4*DDD				] 34 J	3,000	ug/kg	N1-B	17/30	340 - 4000	3,000	I NA	170,000 N	13,000	INO	DOL
Type   Type							I DOV O MINOR COLD D	040	1 04 50	1 000	I NA	1 0000 0	T NA	I Na	DCI
So29.3   4,4**DDT															
T1098-82-5   Arcotor 1260   13 J   14 J   13 J   13 J   14 J   13 J   13 J   14 J   13 J   13 J   14 J   13 J   13 J   14 J   13 J   14 J   13 J   14 J   13 J   14 J   13 J   14 J   13 J   14 J   13 J   14 J   13 J   14 J   13 J   14 J   13 J   14 J   13 J   14 J   13 J															
138-38-3   Total Acoloris   58 P   100   ug/kg   S42 SWN   2/2   100   NA   220 C   10,000   No   BSL	1														
T2-20-8   Endrin									34 - 53						
Metals															
T429-90-5			Endrin	5.5	5.5	ug/kg	DSY-S-1P11-1213	1/18	3.4 - 5.3	5.5	NA NA	1,800 N	NA NA	INO	BSL
7440-38-2 Arsenic 3.9 37.3 mg/kg DSY-S.TP12-1213 43/44 4.1 - 4.1 37.3 20 0.39 C 7 Yes ASL 7440-39-3 Bartum 0.3 37 mg/kg S42 SWN 42/44 2.6 - 4.1 37 36 1,500 N 5,500 No BSL 7440-417 Beryllium 0.22 J 0.54 mg/kg DSY-S.TP13-1011 23/27 0.16 0.23 0.54 0.64 16 N 1.5 No BSL, DW 7440-43-9 Cadmium 0.7 J 2.8 mg/kg N1-0 24/44 0.51 - 1.3 2.8 0.23 7 N 39 No BSL, DW 7440-43-9 Cadmium 363 J 3.650 J mg/kg DSY-S.TP13-1011 27/27 - 3.630 1.699 NA NA NA NO NUT 7440-47-3 Chromium 6.3 J 22 mg/kg N1-0 44/44 - 22 16 0.29 Cl <sup>10</sup> 330 l <sup>10</sup> Yes ASL 7440-48-4 Gobalt 3.9 J 20.2 J mg/kg DSY-S.TP11-121 27/27 - 20.2 17 2.3 N NA Yes ASL 7440-84-4 Gobalt 3.9 J 20.2 J mg/kg DSY-S.TP11-121 27/27 - 27.9 24 310 N 3,100 No BSL 7439-80-6 Iron 14,300 40,100 mg/kg DSY-S.TP11-121 27/27 - 40,100 39.173 5,500 N NA NA NO NO DSL 7439-97-6 Iron 14,300 40,100 mg/kg DSY-S.TP11-1213 27/27 - 40,100 39.173 5,500 N NA NA NA NO NO DSL 7439-97-6 Manganese 86.2 J 612 J mg/kg DSY-S.TP11-1213 27/27 - 4,530 3.811 NA NA NA NO NO DSL 7439-97-6 Manganese 86.2 J 612 J mg/kg DSY-S.TP11-1213 27/27 - 4,530 3.811 NA NA NA NA NO NUT Metals (continued)  7439-97-6 Manganese 86.2 J 612 J mg/kg DSY-S.TP11-1213 27/27 - 4,530 3.811 NA NA NA NA NA NA NA NA NA NA NA NA NA							T			1 11000	70.00	00 N	614	V	401
Tado-39-3   Barium															
7440-41-7 Beryllium 0.22 J 0.54 mg/kg DSY-S-TP13-1011 23/27 0.18-0.23 0.54 0.64 16 N 1.55 No BSL_BK 7440-43-9 Cadmium 0.7 J 2.8 mg/kg N1-0 24/44 0.51-1.3 2.8 0.29 7 N 39 No BSL_BK 7440-70-2 Calcium 363 J 3.630 J mg/kg DSY-S-B9-1416 27/27 . 3.630 1.689 NA NA NA NA NA NA NA NA NA NA NA NA NA	ì														
T440-43-9   Cadmium															
7440-70-2 Calcium 363 J 3,630 J mg/kg DSY-SB-09-1416 27/27 - 3,630 1,689 NA NA NA NA NA NO NUT 7440-47-3 Chromium 6.3 J 22 mg/kg N1-0 44/44 - 22 18 0.29 C(10) 390 (10) Yes ASL 7440-48-4 Cobalt 3.9 J 20.2 J mg/kg DSY-S-TP11-1213 27/27 - 20.2 17 2.3 N NA Yes ASL 7440-50-8 Copper 5.1 J 27.9 mg/kg DSY-S-TP25-0507 27/27 - 27.9 24 310 N 3,100 No BSL 7439-99-6 Iron 14,300 40,100 mg/kg DSY-S-TP11-1213 27/27 - 40,100 39,173 5,500 N NA Yes ASL 7439-99-1 Lead 2.1 J 45 mg/kg DSY-S-TP11-1213 27/27 - 40,100 39,173 5,500 N NA Yes ASL 7439-95-1 Magnesium 1,900 4,530 mg/kg DSY-S-TP12-1213 27/27 - 40,100 39,173 5,500 N NA NA NA NO NUT Metals (continued)  7439-96-5 Manganese 86.2 J 612 J mg/kg DSY-S-TP11-1213 27/27 - 4,530 3,811 NA NA NA NO NUT Metals (continued)  7439-97-6 Mercury 0.07 0.15 mg/kg DSY-S-TP11-1213 27/27 - 612 1,037 180 N 390 No BSL 7440-02-0 Nickel 10.4 J 33.1 mg/kg DSY-S-TP11-1213 27/27 - 33.1 28 150 N 1,000 No BSL 7440-02-0 Nickel 10.4 J 33.1 mg/kg DSY-S-TP11-1213 27/27 - 33.1 28 150 N 1,000 No BSL 7440-02-0 Sickel 10.4 J 33.1 mg/kg DSY-S-TP11-1213 27/27 - 33.1 28 150 N 1,000 No BSL 7440-02-0 Sickel 10.4 J 33.1 mg/kg DSY-S-TP13-0506 4/25 0.68 - 1.1 1.4 0.286 39 N 390 No BSL 7440-02-4 Sivier 1.6 J 5 mg/kg DSY-S-TP13-0506 4/25 0.68 - 1.1 1.4 0.286 39 N 390 No BSL 7440-02-4 Sivier 1.6 J 5 mg/kg DSY-S-TP13-0506 4/25 0.68 - 1.1 1.4 0.286 39 N 390 No BSL 7440-02-2 Vanadium 82.8 22.8 mg/kg DSY-S-My07-3436 3/27 21.4 143 22.8 33 NA NA NA NA NA NA NA NA NA NA NA NA NA															
7440-47-3 Chromium         6.3 J         22 mg/kg         N1-0         44/44         - 22         18         0.29 C <sup>100</sup> S90 (100)         390 (100)         Yes ASL           7440-48-4 Cobalt         3.9 J         20.2 J         mg/kg         DSY-S-TP11-1213         27/27         - 20.2         17         2.3 N         NA         Yes ASL           7440-50-8 Copper         5.1 J         27.9 mg/kg         DSY-S-TP25-0507         27/27         - 20.2         17         2.3 N         NA         Yes ASL           7439-98-6 Iron         14,300         40,100         mg/kg         DSY-S-TP11-1213         27/27         - 40,100         39,173         5,500 N         NA         Yes ASL           7439-92-1 Lead         2.1 J         45         mg/kg         N1-E         44/44         - 45         12         400         150         No         BSL           7439-95-4 Magnesium         1,900         4,530         mg/kg         DSY-S-TP12-1213         27/27         - 4,530         3,811         NA         NA         NA         NO         NUT           Metals (continued)         7439-96-5 Marganese         86.2 J         612 J         mg/kg         DSY-S-TP11-1213         27/27         - 612         1,037         180 N															
7440-48-4 Cobalt 3.9 J 20.2 J mg/kg DSY-S-TP11-1213 27/27 - 20.2 17 2.3 N NA Yes ASL 7440-50-8 Copper 5.1 J 27.9 mg/kg DSY-S-TP25-0507 27/27 - 27.9 24 310 N 3,100 No BSL 7439-89-6 Iron 14,300 40,100 mg/kg DSY-S-TP11-1213 27/27 - 40,100 39.173 5.500 N NA Yes ASL 7439-92-1 Lead 2.1 J 45 mg/kg N1-E 44/44 - 45 12 400 150 No BSL 7439-95-4 Magnesium 1,900 4,530 mg/kg DSY-S-TP12-1213 27/27 - 4,530 3.811 NA NA NA NA NA NA NA NA NA NA NA NA NA		7440-70-2	Calcium	363 J	3,630 J	mg/kg	DSY-SB-09-1416	27/27	-						
7440-50-8 Copper 5.1 J 27.9 mg/kg DSY-S-TP25-0507 27/27 - 27.9 24 310 N 3,100 No BSL 7439-89-6 Iron 14,300 40,100 mg/kg DSY-S-TP11-1213 27/27 - 40,100 39,173 5,500 N NA Yes ASL 7439-92-1 Lead 2.1 J 45 mg/kg N1-E 44/44 - 45 12 400 150 No BSL 7439-95-4 Magnesium 1,900 4,530 mg/kg DSY-S-TP12-1213 27/27 - 4,530 3,811 NA NA NA NA NO NUT Metals (continued)    Metals (continued)		7440-47-3	Chromium	6.3 J	22	mg/kg	N1-0	44/44	-	22	18	0.29 C <sup>(10)</sup>		Yes	
7439-89-6   Iron		7440-48-4	Cobalt	3.9 J	20.2 J	mg/kg	DSY-S-TP11-1213	27/27	-						
7439-92-1 Lead 2.1 J 45 mg/kg N1-E 44/44 - 45 12 400 150 No BSL 7439-95-4 Magnesium 1,900 4,530 mg/kg DSY-S-TP12-1213 27/27 - 4,530 3,811 NA NA NA NA NA NA NA NA NA NA NA NA NA		7440-50-8	Copper	5.1 J	27.9	mg/kg	DSY-S-TP25-0507	27/27	-	27.9	24	310 N	3,100		
Table   Tabl		7439-89-6	Iron	14,300	40,100	mg/kg	DSY-S-TP11-1213	27/27	-	40,100	39,173	5,500 N		Yes	
T439-95-4   Magnesium	ţ						N1-E	44/44	-	45	12	400	150	No	BSL
Metals (continued)           7439-96-5   Manganese         86.2 J         612 J         mg/kg         DSY-S-TP11-1213         27/27         -         612         1,037         180 N         390         No         BKG           7439-97-6   Mercury         0.07         0.15 mg/kg         DSY-S-MW07-1618-D         2/27         0.04 - 0.13         0.15         0.012         2.3 N(11)         23         No         BSL           7440-02-0   Nickel         10.4 J         33.1 mg/kg         DSY-S-TP11-1213         27/27         -         33.1         28         150 N         1,000         No         BSL           7440-09-7   Potassium         190         658 mg/kg         DSY-S-B-14-0103-D         27/27         179 - 179         658         1,699         NA         NA         NA         NO         NUT, BF           7782-49-2   Selenium         0.83 J         1.4 mg/kg         DSY-S-P13-0506         4/25         0.68 - 1.1         1.4         0.286         39 N         390         No         BSL           7440-22-4   Silver         1.6 J         5 mg/kg         N1-0         10/36         1 - 1.6         5         0.12         39 N         200         No         BSL           7440-23-5   Sodium				1,900			DSY-S-TP12-1213	27/27		4,530	3,811	NA	NA NA	No	NUT
7439-96-5         Manganese         86.2 J         612 J         mg/kg         DSY-S-TP11-1213         27/27         612         1,037         180 N         390         No         BKG           7439-97-6         Mercury         0.07         0.15         mg/kg         DSY-S-MW07-1618-D         2/27         0.04 - 0.13         0.15         0.012         2.3 N(11)         23         No         BSL           7440-02-0         Nickel         10.4 J         33.1         mg/kg         DSY-S-TP11-1213         27/27         -         33.1         28         150 N         1,000         No         BSL           7440-09-7         Potassium         190         658         mg/kg         DSY-S-TP14-10103-D         27/27         179 - 179         658         1,699         NA         NA         NA         NA         NO         NUT, BF           7782-49-2         Selenium         0.83 J         1.4         mg/kg         DSY-S-TP13-0506         4/25         0.68 - 1.1         1.4         0.266         39 N         390         No         BSL           7440-22-4         Silver         1.6 J         5         mg/kg         N1-0         10/36         1 - 1.6         5         0.12         39 N         20				· · · · · · · · · · · · · · · · · · ·											
7439-97-6         Mercury         0.07         0.15         mg/kg         DSY-S-MW07-1618-D         2/27         0.04 - 0.13         0.15         0.012         2.3 N(11)         23         No         BSL           7440-02-0         Nickel         10.4 J         33.1         mg/kg         DSY-S-TP11-1213         27/27         -         33.1         28         150 N         1,000         No         BSL           7440-09-7         Potassium         190         658         mg/kg         DSY-SE-14-0103-D         27/27         179 - 179         658         1,699         NA         NA         NA         NO         NUT, BF           7782-49-2         Selenium         0.83 J         1.4         mg/kg         DSY-S-TP13-0506         4/25         0.68 - 1.1         1.4         0.26         39 N         390         No         NO         BSL           7440-22-4         Silver         1.6 J         5         mg/kg         N1-0         10/35         1-1.6         5         0.12         39 N         200         No         BSL           7440-23-5         Sodium         82.8         228         mg/kg         DSY-S-MW07-3436         3/27         21.4 - 143         228         33         NA				86.2 J	612 J	mg/kg	DSY-S-TP11-1213	27/27	-	612	1,037	180 N	390	No	BKG
Total Column   Tota			<del></del>	···			DSY-S-MW07-1618-D	2/27	0.04 - 0.13	0.15	0.012	2.3 N <sup>(11)</sup>	23	No	BSL
7440-09-7         Potassium         190         658         mg/kg         DSY-SB-14-0103-D         27/27         179-179         658         1,699         NA         NA         NO         NUT, BF           7782-49-2         Selenium         0.83 J         1.4         mg/kg         DSY-S-TP13-0506         4/25         0.68 - 1.1         1.4         0.286         39 N         390         No         BSL           7440-22-4         Silver         1.6 J         5         mg/kg         N1-0         10/36         1 - 1.6         5         0.12         39 N         200         No         BSL           7440-23-5         Sodium         82.8         228         mg/kg         DSY-S-MW07-3436         3/27         21.4 - 143         228         33         NA         NA         NA         NO         NUT           7440-62-2         Vanadium         8.9 J         22.8 J         mg/kg         DSY-SB-10-1416         27/27         -         22.8         23         39 N         550         No         BSL, BK									<del></del>						
7782-49-2         Selenium         0.83 J         1.4         mg/kg         DSY-S-TP13-0506         4/25         0.68 - 1.1         1.4         0.286         39 N         390         No         BSL           7440-22-4         Silver         1.6 J         5         mg/kg         N1-0         10/36         1 - 1.6         5         0.12         39 N         200         No         BSL           7440-23-5         Sodium         82.8         228         mg/kg         DSY-S-W07-3436         3/27         21.4 - 143         228         83         NA         NA         NA         NO         NUT           7440-62-2         Vanadium         8.9 J         22.8 J         mg/kg         DSY-SB-10-1416         27/27         -         22.8         23         39 N         550         No         BSL, BK	I														NUT, BKG
7440-22-4         Silver         1.6 J         5         mg/kg         N1-0         10/36         1 - 1.6         5         0.12         39 N         200         No         BSL           7440-23-5         Sodium         82.8         228         mg/kg         DSY-S-MW07-3436         3/27         21.4 - 143         228         33         NA         NA         NA         NO         NUT           7440-62-2         Vanadium         8.9 J         22.8 J         mg/kg         DSY-SB-10-1416         27/27         -         22.8         23         39 N         550         No         BSL, BK	I														
7440-23-5   Sodium   82.8   228   mg/kg   DSY-S-MW07-3436   3/27   21.4 - 143   228   33   NA   NA   NO   NUT   7440-62-2   Vanadium   8.9 J   22.8 J   mg/kg   DSY-SB-10-1416   27/27   - 22.8   23   39 N   550   No   BSL, BK	I														
7440-62-2 Vanadium 8.9 J 22.8 J mg/kg DSY-SB-10-1416 27/27 - 22.8 23 39 N 550 No BSL, BK	I														
THI VEL TURBURN															BSL. BKG
	I			28 J	82.5	mg/kg	DSY-SB-03-0911	27/27	<del>                                     </del>	82.5	66	2,300 N	6.000	No	BSL

### TABLE 2.7 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Current/Future Medium: Subsurface Soil Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
	Miscellaneo	us Parameters												
ì	1461-25-2	Tetrabutyltin	4.6 J	27 J	ug/kg	DSY-S-TP13-0506	1/18	49 - 50	27	NA	1,800 N <sup>(12)</sup>	NA	No	BSL
	56573-85-4	Tributyltin	4.9 J	4.9 J	ug/kg	DSY-S-MW05-1012	1/18	49 - 50	4.9	NA	1,800 N	NA	No	BSL

### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for acenaphthene.
- 9 Value is for pyrene.
- 10 Value is for hexavalent chromium.
- 11 Value is for mercuric chloride (and other mercury salts).
- 12 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### Associated Samples

S42 SWW

Associated Samples	
DSY-S-MW04-3234	DSY-SB-01-0911
DSY-S-MW05-1012	DSY-SB-03-0911
DSY-S-MW05-2224	DSY-SB-09-1416
DSY-S-MW05-3234	DSY-SB-10-1416
DSY-S-MW05-4446	DSY-SB-14-0103
DSY-S-MW07-0810	DSY-SB-14-0103-D
DSY-S-MW07-1618	DSY-SB-15-0103
DSY-S-MW07-1618-D	DSY-S-TP11-0507
DSY-S-MW07-2224	DSY-S-TP11-1213
DSY-S-MW07-3436	DSY-S-TP12-0507
N1-0	DSY-S-TP12-1213
N1-100	DSY-S-TP13-0506
N1-150	DSY-S-TP13-0506-D
N1-200	DSY-S-TP13-1011
N1-250	DSY-S-TP15-0506
N1-50	DSY-S-TP15-1112
N1-A	DSY-S-TP17-0507
N1-B	DSY-S-TP17-1112
N1-C	DSY-S-TP25-0507
N1-D	DSY-S-TP25-1011
N1-E	DPSOIL02
S1	
S42 BOT	
S42 SWE	
S42 SWN	
S42 SWS	

### Definitions:

C = Carcinogen COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

### Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels BSL = Below COPC Screening Level

NTX = No toxicity criteria

## TABLE 2.8 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Groundwater Exposure Medium: Groundwater PAGE 1 OF 2

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Central Shipyard		anic Compounds Acetone	3.28 J	3.28 J	ug/L	DSY-GW-MW219-031611-D	1/4	5 - 10	3.28	NA NA	1,200 N	NA NA	NA	No	BSL
	Metals (Total	1)					<u> </u>			L		NA NA	NA		
	7429-90-5		52.9	1,240	ug/L	DSY-A-MW07-01	3/4	16 - 16	1,240	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	Yes	ASL
	7440-38-2	Arsenic	27.8	78.1 J	ug/L	DSY-GW-MW219-031611-D	3/4	4 - 4	78.1	NA NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
	7440-39-3	Barium	34	86.6	ug/L	DSY-GW-MW218-030111	4/4	-	86.6	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
	7440-43-9	Cadmium	1.41	1.53	ug/L	DSY-GW-MW219-031611	1/4	0.5 - 3	1.53	NA	0.69 N	5	EPA-MCL RIDEM	Yes	ASL
	7440-70-2	Calcium	14,100	126,000	ug/L	DSY-A-MW05-01	4/4	-	126,000	NA	NA	NA NA	NA NA	No	NUT
	7440-47-3	Chromium	12.8 J	12.8 J	ug/L	DSY-A-MW07-01	1/4	1 - 6	12.8	NA	0.031 C	100	EPA-MCL RIDEM	Yes	ASL
	7440-48-4	Cobalt	13.7	24.8	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 4.5	24.8	NA NA	0.47 N	NA NA	NA NA	Yes	ASL
	7439-89-6	Iron	1,260	65,800 J	ug/L	DSY-GW-MW219-031611-D	4/4	-	65,800	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
	7439-92-1	Lead	1.07 J	1.8 J	ug/L	DSY-A-MW07-01	2/4	1 - 3.75	1.8	NA	NA	15 15	EPA-MCL RIDEM	No	BSL
	7439-95-4	Magnesium	5,430	40,000	ug/L	DSY-A-MW05-01	4/4	-	40,000	NA	NA	NA NA	NA NA	No	NUT
	7439-96-5	Manganese	753	9,100	ug/L	DSY-GW-MW218-030111	4/4		9,100	NA	32 N	50 NA	EPA-SDWR NA	Yes	ASL
	7440-02-0	Nickel	4.64	4.64	ug/L	DSY-GW-MW218-030111	1/4	1.5 - 11.3	4.64	NA	30 N	NA 100	NA RIDEM	No	BSL
	7440-09-7	Potassium	2,490	11,000	ug/L	DSY-GW-MW218-030111	4/4	-	11,000	NA	NA	NA NA	NA NA	No	NUT
	7782-49-2	Selenium	1.24 J	1.55 J	ug/L	DSY-GW-MW219-031611	1/4	4 - 6.25	1.55	NA	7.8 N	50 50	EPA-MCL RIDEM	No	BSL
	7440-23-5	Sodium	34,400	379,000	ug/L	DSY-A-MW05-01	4/4	-	379,000	NA	NA	NA NA	NA NA	No	NUT
	7440-66-6	Zinc	1.52 J	3.59 J	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 26.4	3.59	NA NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
	Metals (Dis	solved)	<u> </u>	1			<u> </u>		<u> </u>		l		·		l
	7429-90-5	Aluminum	29.7 J	38 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	38	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	No	BSL
	7440-38-2	Arsenic	29.1	78.9 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	78.9	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	AŠL
	7440-39-3	Barium	33.7	84.4	ug/L	DSY-GW-MW218-030111	2/2	-	84.4	NÁ	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
	7440-43-9	Cadmium	1.52	1.62	ug/L	DSY-GW-MW219-031611	1/2	0.5 - 0.5	1.62	NA	0.69 N	5 5	EPA-MCL RIDEM	Yes	ÁSL
	7440-70-2	Calcium	39,000 J	76,600	ug/L	DSY-GW-MW218-030111	2/2		76,600	NA	NA	NA NA	NA NA	No	NUT
	7440-48-4	Cobalt	13.6	24.2	ug/L	DSY-GW-MW218-030111	2/2	-	24.2	NA NA	0.47 N	NA NA	NA NA	Yes	ASL
	7439-89-6	Iron	9,900	63,900 J	ug/L	DSY-GW-MW219-031611	2/2	-	63,900	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
	7439-92-1	Lead	0.488 J	0.667 J	ug/L	DSY-GW-MW219-031611	1/2	3.75 - 3.75	0.667	NA	NA	15 15	EPA-MCL RIDEM	No	BSL
	7439-95-4	Magnesium	8,090 J	16,200	ug/L	DSY-GW-MW218-030111	2/2	٠,	16,200	NA	NA	NA NA	NA NA	No	NUT
	7439-96-5	Manganese	4,610	8,680	ug/L	DSY-GW-MW218-030111	2/2	-	8,680	NA	32 N	50 NA	EPA-SDWR	Yes	ASL
	7440-02-0	Nickel	4.73	4.73	ug/L	DSY-GW-MW218-030111	1/2	1.75 - 1.75	4.73	NĀ	30 N	NA 100	NA RIDEM	No	BSL.

### TABLE 2.8 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Current/Future

Medium: Groundwater Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
	7440-09-7	Potassium	6,240	10,800	ug/L	DSY-GW-MW218-030111	2/2	-	10,800	NA	NA	NA NA	NA NA	No	NUT
	7782-49-2	Selenium	1.34 J	1.44 J	ug/L	DSY-GW-MW219-031611-D	1/2	6.25 - 6.25	1.44	NA	7.8 N	50 50	ÉPA-MCL RIDEM	No	BSL
	7440-23-5	Sodium	35,800	61,900	ug/L	DSY-GW-MW218-030111	2/2	-	61,900	NA	NA	NA NA	NA NA	No	NUT
}	7440-66-6	Zinc	3.5 J	3.5 J	ug/L	DSY-GW-MW218-030111	1/2	2.5 - 2.5	3.5	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL.

### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Associated Samples**

DSY-A-MW05-01 DSY-A-MW07-01 DSY-GW-MW218-030111 DSY-GW-MW219-031611 DSY-GW-MW219-031611-D DSY-GW-MW219-031611-AVG

### Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

CAS = Chemical Abstracts Service

COPC = Chemical Of Potential Concern

EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)

EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

RIDEM = Rhode Island Department of Environmental Management GA Groundwater Objective (November, 2011).

### Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:

BSL = Below COPC Screening Level

NTX = No toxicity criteria

## TABLE 2.9 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - CENTRAL SHIPYARD FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Groundwater

Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Screening Toxicity Value <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Central	Volatile Org	anic Compounds													
Shipyard	67-64-1	Acetone	3.28 J	3.28 J	ug/L	DSY-GW-MW219-031611-D	1/4	5 - 10	3.28	NA NA	2,300,000 N	NA	NA	No	BSL
	Metals														
	7429-90-5	Aluminum	52.9	1,240	ug/L	DSY-A-MW07-01	3/4	16 - 16	1,240	NA NA	NA	NA	NA	No	NTX
	7440-38-2		27.8	78.1 J	ug/L_	DSY-GW-MW219-031611-D	3/4	4 - 4	78.1	NA	NA NA	NA	NA	No	NTX
	7440-39-3	Barium	34	86.6	ug/L	DSY-GW-MW218-030111	4/4		86.6	NA	NA NA	NA	NA	No	NTX
i	7440-43-9	Cadmium	1.41	1.53	ug/L	DSY-GW-MW219-031611	1/4	0.5 - 3	1.53	NA NA	NA_	NA	NA	No	NTX
	7440-70-2	Calcium	14,100	126,000	ug/L	DSY-A-MW05-01	4/4	-	126,000	NA	NA NA	NA	NA	No	NUT
	7440-47-3	Chromium	12.8 J	12.8 J	ug/L	DSY-A-MW07-01	1/4	1 - 6	12.8	NA NA	NA NA	NA	NA	No	NTX
	7440-48-4	Cobalt	13.7	24.8	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 4.5	24.8	NA NA	NA NA	NA_	NA	No	NTX
	7439-89-6	Iron	1,260	65,800 J	ug/L	DSY-GW-MW219-031611-D	4/4	-	65,800	NA NA	NA	NA	NA NA	No	NTX
	7439-92-1	Lead	1.07 J	1.8 J	ug/L	DSY-A-MW07-01	2/4	1 - 3.75	1.B	NA	NA	NA NA	NA	No	NTX
	7439-95-4	Magnesium	5,430	40,000	ug/L	DSY-A-MW05-01	4/4	-	40,000	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	753	9,100	ug/L	DSY-GW-MW218-030111	4/4		9,100	NA NA	NA NA	NA_	NA	No	NTX
	7440-02-0	Nickel	4.64	4.64	ug/L	DSY-GW-MW218-030111	1/4	1.5 - 11.3	4.64	NA	NA	NA	NA	No	NTX
	7440-09-7	Potassium	2,490	11,000	ug/L	DSY-GW-MW218-030111	4/4		11,000	NA	NA	NA _	NA	No	NUT
	7782-49-2	Selenium	1.24 J	1.55 J	ug/L	DSY-GW-MW219-031611	1/4	4 - 6.25	1.55	NA NA	NA.	NA	NA	No	NTX
	7440-23-5	Sodium	34,400	379,000	ug/L	DSY-A-MW05-01	4/4		379,000	NA	NA	NA	NA	No	NUT
	7440-66-6	Zinc	1.52 J	3.59 J	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 26.4	3.59	NA	NA NA	NA	NA	No	NTX
	Dissolved M	letals				-									
	7429-90-5	Aluminum	29.7 J	38 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	38	NA NA	NA_	NA	NA	No_	NTX
	7440-38-2	Arsenic	29.1	78.9 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	78.9	NÁ	NA	NA	NA	No	NTX
	7440-39-3	Barium	33.7	84.4	ug/L	DSY-GW-MW218-030111	2/2		84.4	NA .	NA NA	NA	NA	No	NTX
	7440-43-9	Cadmium	1.52	1.62	ug/L	DSY-GW-MW219-031611	1/2	0.5 - 0.5	1.62	NA	NA NA	NA	NA	No	NTX
	7440-70-2	Calcium	39,000 J	76,600	ug/L	DSY-GW-MW218-030111	2/2	-	76,600	NA NA	NA NA	NA	NA	No	NUT
		Cobalt	13.6	24.2	ug/L	DSY-GW-MW218-030111	2/2	-	24.2	NA NA	NA	NA NA	NA	No	NTX
	7439-89-6	Iron	9,900	63,900 J	ug/L	DSY-GW-MW219-031611	2/2	-	63,900	NA	NA .	NA	NA	No	NTX
		Lead	0,488 J	0.667 J	ug/L	DSY-GW-MW219-031611	1/2	3.75 - 3.75	0.667	NA	NA NA	NA	NA	No	NTX
		Magnesium	8.090 J	16,200	ug/L	DSY-GW-MW218-030111	2/2	-	16,200	NA	NA NA	NA	NA	No	NUT
		Manganese	4,610	8,680	ug/L	DSY-GW-MW218-030111	2/2	-	8,680	NÁ	NA NA	NA	NA	No	NTX
	7440-02-0		4.73	4.73	ug/L	DSY-GW-MW218-030111	1/2	1.75 - 1.75	4.73	NA NA	NA NA	NA	NA	No	NTX
(	7440-02-0		6.240	10.800	ug/L	DSY-GW-MW218-030111	2/2		10.800	NA NA	NA NA	NA	NA	No	NUT
Į.	7782-49-2		1.34 J	1,44 J	ug/L	DSY-GW-MW219-031611-D	1/2	6.25 - 6.25	1.44	NA NA	NA.	NA.	NA	No	NTX
	7440-23-5		35,800	61,900	ug/L	DSY-GW-MW218-030111	2/2		61,900	NA NA	NA NA	NA.	NA NA	No	NUT
	7440-23-5		35,600 3.5 J	3.5 J	ug/L ug/L	DSY-GW-MW218-030111	1/2	2.5 - 2.5	3.5	NA NA	NA NA	NA NA	NA NA	No	NTX
	I /44U-00-6	Zinc	1 3.5 1	J.0 J	L uy/c	DOT-GAA-MAAS 10-000111	1/2				1	. '*'			

### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
- Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### Associated Samples

DSY-A-MW05-01 DSY-A-MW07-01 DSY-GW-MW218-030111 DSY-GW-MW219-031611-D DSY-GW-MW219-031611-D

### Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

CAS = Chemical Abstracts Service

COPC = Chemical Of Potential Concern

J = Estimated value

NA = Not Applicable/Not Available

### Rationale Codes:

For selection as a COPC: ASL = Above Screening Level.

For elimination as a COPC:

BSL = Below COPC Screening Level NTX = No toxicity criteria

NUT = Essential nutrient

NVT = Not sufficiently volatile and/or toxic to pose inhalation risk.

## TABLE 2.10 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Surface Soil Exposure Medium: Surface Soil

### PAGE 1 OF 2

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(5)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Former	Volatile Org 108-88-3	anic Compounds	1 41	0.1.1		DSY-S-TP08-0001	T 6/7	46.44		I NA	T 500 000 N	T 400 000	l Na l	DO!
Building 234		Total Xylenes	1 J 3 J	2 J 3 J	ug/kg ug/kg	DSY-S-1P08-0001 DSY-S-MW08-SS01	2/7	10 - 11	3	NA NA	500,000 N 63,000 N	190,000 110,000	No No	BSL BSL
		Organic Compounds	30	3.0	ug/kg	D31-3-WWV06-3301	111	10-11		INA	1 63,000 N	110,000	INO	DOL
		Acenaphthene	46 J	52 J	ug/kg	DSY-S-MW08-SS01	2/7	340 - 1700	52	NA NA	340,000 N	43,000	No	BŞL
		Anthracene	51 J	110 J	ug/kg	DSY-S-MW08-SS01	3/7	340 - 1700	110	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	60 J	470 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	470	NA	150 C	900	Yes	ASL
		Benzo(a)pyrene	50 J	410 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	410	NA	15 C	400	Yes	ASL
		Benzo(b)fluoranthene	36 J	660 J	ug/kg	DSY-S-MW09-0001	7/8	710 - 710	660	NA	150 C	900	Yes	ASL
		Benzo(g,h,i)perylene	48 J	190 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA NA	170,000 N <sup>(8)</sup>	800	No	BSL
	207-08-9	Benzo(k)fluoranthene	76 J	270 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	270	NA	1,500 C	900	No	BSL
	117-81-7 86-74-8	Bis(2-ethylhexyl)phthalate	3,000	8,700	ug/kg	DSY-S-TP07-0001	2/8	350 - 2700 340 - 1700	8,700	NA NA	35,000 C	46,000	No	BSL
		Carbazole Chrysene	37 J 41 J	56 J 580 J	ug/kg ug/kg	DSY-S-TP10-0001 DSY-S-MW09-0001	7/8	350 - 710	56 580	NA NA	NA 15,000 C	NA 400	No Yes	NTX ASL
		Dibenzo(a,h)anthracene	62 J	62 J	ug/kg	DSY-S-MW09-0001	1/7	340 - 1700	62	NA NA	15,000 C	400	Yes	ASL
		di-n-Butyl Phthalate	51 J	64 J	ug/kg	DSY-S-MW09-0001	2/7	340 - 1700	64	NA NA	610,000 N	NA NA	No	BSL
		di-n-Octyl Phthalate	62 J	62 J	ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	62	NA NA	NA NA	NA NA	No	NTX
	206-44-0	Fluoranthene	50 J	770 J	ug/kg	DSY-S-MW09-0001	6/8	710 - 1700	770	NA	230,000 N	20,000	No	BSL
		Fluorene	50 J	50 J	ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	50	NA	230,000 N	28,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	48 J	190 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA	150 C	900	Yes	ASL
	85-01-8	Phenanthrene	36 J	420 J	ug/kg	DSY-S-MW08-SS01	6/8	710 - 1700	420	NA	170,000 N <sup>(8)</sup>	40,000	No	BSL
	129-00-0		72 J	750 J	ug/kg	DSY-S-MW09-0001	7/8	710 - 710	750	NA NA	170,000 N	13,000	No	BSL
	Pesticides/F					T 500 0 7000 0001 0		2.1.22		T	1 100 0	1 14	1 1	501
	72-55-9		4.5 J	4.5 J	ug/kg	DSY-S-TP08-0001-D DSY-S-TP08-0001	3/7	3.4 - 3.6	4.5 8.9	NA NA	1,400 C 1,700 C	NA NA	No No	BSL BSL
	-	4,4'-DDT	5 J	8.9	ug/kg			3.4 - 3.6				+		
		Aroclor-1254	38 J	38 J	ug/kg	DSY-S-MW08-SS01	1/7	34 - 36	38	NA NA	110 N <sup>(9)</sup>	NA NA	No	BSL
		Aroclor-1260	24 J	24 J	ug/kg	DSY-S-TP10-0001	1/7	34 - 36	24	NA	220 C	NA	No	BSL
		gamma-Chlordane	3.9	3.9	ug/kg	DSY-S-TP10-0001	1/7	1.7 - 1.9	3.9	NA NA	16,000 C <sup>(10)</sup>	NA NA	No	BSL
		Heptachlor	4.5	4.5	ug/kg	D\$Y-S-TP10-0001	1/7	1.7 - 1.9	4.5	NÀ NÀ	110 C	NA NA	No	B\$L
	Metals	Atuminum	3,810	11,300	malka	DSY-S-TP09-0001	7/7		11,300	16,020	7,700 N	NA NA	No	BKG
	7429-90-5		2,6	23.6	mg/kg mg/kg	DSY-S-TP09-0001	8/8		23.6	13	0.39 C	7	Yes	ASL
	7440-39-3		8.9	180	mg/kg	MW09TP01	8/8	-	180	51	1,500 N	5,500	No	BSL
	7440-41-7		0.18 J	3.5	mg/kg	DSY-S-MW08-SS01	6/7	0.2 - 0.2	3.5	0.58	16 N	1.5	Yes	ASL
	7440-43-9		13	13	mg/kg	MW09TP01	1/8	0.47 - 0.61	13	0.17	7 N	39	Yes	ASL
1	7440-70-2		521	2,790	mg/kg	DSY-S-MW08-SS01	7/7	-	2,790	1.598	NA	NA NA	No	NUT
{	<del></del>	Chromium	6.4 J	130	mg/kg	MW09TP01	8/8	_	130	16	0.29 C <sup>(11)</sup>	390 (11)	Yes	ASL
		Cobalt	3.3	23.9	mg/kg	DSY-S-MW08-SS01	7/7	-	23.9	9	2.3 N	NA NA	Yes	ASL
		Copper	12.9	262	mg/kg	DSY-S-MW08-SS01	7/7		262	12.4	310 N	3,100	No	BSL
		Iron	7,770	37,200	mg/kg	DSY-S-TP09-0001	7/7	-	37,200	24,200	5,500 N	NA	Yes	ASL
		Lead	9.7 J	189 J	mg/kg	DSY-S-MW08-SS01	8/8	-	189	40	400	150	Yes	AŠL
	7439-95-4	Magnesium	1,170	3,380	mg/kg	DSY-S-TP09-0001	7/7	-	3,380	2,571	NA	NA	No	NUT
	7439-96-5	Manganese	157	597	mg/kg	DSY-S-TP09-0001	7/7	-	597	349	180 N	390	Yes	ASL
	7439-97-6	Mercury	0.07	0.07	mg/kg	DSY-S-MW08-SS01	1/7	0.05 - 0.09	0.07	0.18	2.3 N <sup>(12)</sup>	23	No	BSL, BKG
I	7440-02-0		7.8 J	113	mg/kg	DSY-S-MW08-SS01	7/7		113	15	150 N	1,000	No	BSL
	Metals (Con	tinued)												
	7440-09-7		227	397	mg/kg	DSY-S-TP26-0001	7/7	-	397	651	NA	NA	No	NUT, BKG
	7782-49-2		3	3	mg/kg	MW09TP01	1/8	0.63 - 0.81	3	0.57	39 N	390	No	BSL
1	7440-23-5		19 J	163 J	mg/kg	DSY-S-MW08-SS01	5/7	20.5 - 45.1	163	231	NA	NA	No	NUT, BKG
1	7440-62-2		6.8 J	23.2 J	mg/kg	DSY-S-TP10-0001	7/7		23.2	34	39 N	550	No	BSL, BKG
ľ	7440-66-6		44.3 J	831 J	mg/kg	DSY-S-MW08-SS01	7/7	-	831	62	2,300 N	6,000	No	BSL
İ		us Parameters				T = 0.00 = === :				1	1			
		Tetrabutyltin	11.4 J	11.4 J	ug/kg	DSY-S-TP09-0001	1/7	49 - 50	11.4	NA NA	1,800 N <sup>(13)</sup>	NA NA	No	BSL
	56573-85-4	Tributyitin	2.1 J	6.9 J	ug/kg	DSY-S-MW08-SS01	2/7	49 - 50	6.9	NA	1,800 N	NA	No	BSL

### **TABLE 2.10**

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Footnotes:

PAGE 2 OF 2

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for pyrene.
- 9 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 10 Value is for chlordane.
- 11 Value is for hexavalent chromium.
- 12 Value is for mercuric chloride (and other mercury salts).
- 13 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

**Associated Samples** 

DSY-S-MW08-SS01

DSY-S-MW09-0001

MW09TP01

DSY-S-TP07-0001 DSY-S-TP08-0001

DSY-S-TP08-0001-D

DSY-S-TP09-0001

DSY-S-TP10-0001

DSY-S-TP26-0001

Definitions:

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

## TABLE 2.11 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Subsurface Soil Exposure Medium: Subsurface Soil PAGE 1 OF 2

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
Former		anic Compounds				T 007 00 0004	1 440	10.440		I NA	1 100 0	2,500	No	BSL
Building 234	71-43-2	Benzene	1 J 66 J	1 J 66 J	ug/kg ug/ka	DSY-SB-06-0204 DSY-S-TP26-0305	1/10	10 - 110 10 - 12	1 66	NA NA	1,100 C 5,400 C	71,000	No	BSL
	108-88-3	Ethylbenzene Toluene	1 J	1 J	ug/kg ug/kg	DSY-SB-06-0204	1/10	10 - 12	1	NA NA	500,000 N	190,000	No	BSL
	540-59-0	Total 1,2-Dichloroethene	1 1	3 1	ug/kg	DSY-S-MW08-0810	2/10	10 - 110	3	NA NA	70,000 N	630,000	No	BSL
	1330-20-7	Total Xylenes	150	150	ug/kg	DSY-S-TP26-0305	1/10	10 - 12	150	NA NA	63,000 N	110,000	No	BSL
	79-01-6	Trichloroethene	3 J	3 J	ug/kg	DSY-S-MW08-0810	1/10	10 - 110	3	NA NA	440 N <sup>(8)</sup>	13,000	No	BSL
		e Organic Compounds			-5/5			1, 17, 11, 11						
	91-57-6	2-Methylnaphthalene	14,000	14,000	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	14,000	NA	23,000 N	123,000	No	BSL
	120-12-7	Anthracene	900 J	900 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	900	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	48 J	70 J	ug/kg	DSY-S-MW09-1012-D	2/10	340 - 3900	70	NA	150 C	900	No	BSL
	50-32-8	Benzo(a)pyrene	41 J	55 J	ug/kg	DSY-S-TP08-0406	2/10	340 - 3900	55	NA NA	15 C	400	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	63 J	80 J	ug/kg	DSY-S-TP08-0406	2/10	340 - 3900	80	NA	150 C	900	No	BSL
	191-24-2	Benzo(g,h,i)perylene	45 J	45 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	45	NA NA	170,000 N <sup>(9)</sup>	800	No	BSL
	207-08-9	Benzo(k)fluoranthene	68 J	68 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900 340 - 3900	68 22.000	NA NA	1,500 C 35,000 C	900 46,000	No No	BSL BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	22,000	22,000	ug/kg	DSY-S-TP08-0910 DSY-S-MW09-1012,	1/10	340 - 3900		<u> </u>	<del>                                     </del>			
	218-01-9	Chrysene	41 J	54 J	ug/kg	DSY-S-TP08-0406	2/10	340 - 3900	54	NA	15,000 C	400	No	BSL
	84-74-2	di-n-Butyl Phthalate	50 J	50 J	ug/kg	DSY-SB-04-0406	1/10	340 - 3900	50	NA NA	610,000 N	NA NA	No	BSL
	206-44-0	Fluoranthene	100 J	130 J	ug/kg	DSY-S-MW09-1012, DSY-S-MW09-1012-D	3/10	360 - 3900	130	NA	230,000 N	20,000	No	BSL
	86-73-7	Fluorene	2,100 J	2,100 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	2,100	NA	230,000 N	28,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	41 J	41 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	_41	NA	150 C	900	No.	BSL
	91-20-3	Naphthalene	2,200 J	2,200 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	2,200	NA	3,600 C	54,000	No	BSL
	85-01-8	Phenanthrene	51 J	4,800	ug/kg	DSY-S-TP26-0305	4/10	360 - 3600	4,800	NA	170,000 N <sup>(9)</sup>	40,000	No	BSL
	129-00-0	Pyrene	87 J	460 J	ug/kg	DSY-S-TP26-0305	4/10	360 - 3600	460	NA	170,000 N	13,000	No	BSL
	Pesticides/													
		Heptachlor	4	4	ug/kg	DSY-S-TP26-0305	1/10	1.7 - 2.5	4	NA	110 C	NA	No	BSL
	Metals						T 10/10		T	40.075	7 700 N	NIA	V	ASL
		Aluminum	1,690	23,300	mg/kg	DSY-S-TP09-0910	16/16	05.05	23,300 42	13,075 20	7,700 N 0.39 C	NA 7	Yes Yes	ASL
		Arsenic	1.2 J	42	mg/kg_	D\$Y-\$-TP26-0406	15/16 16/16	3.5 - 3.5	33.6	36	1,500 N	5,500	No	BSL. BKG
	7440-39-3	Barium	3.1 J	33.6	mg/kg	DSY-S-TP26-0910 DSY-S-TP08-0406	11/16	0.17 - 0.23	0.67	0.64	1,500 N	1,5	No	BSL
	7440-41-7 7440-43-9	Beryllium Cadmium	0.2 J 0.66 J	0.67 0.66 J	mg/kg mg/kg	DSY-S-TP10-1213	1/16	0.17 - 0.23	0.66	0.23	7 N	39	No	BSL
	7440-43-9	Calcium	322 J	5,190	mg/kg	DSY-S-MW09-3638	16/16	-	5,190	1,689	NA NA	NA NA	No	NUT
				<del></del>		DSY-SB-06-0204	16/16		60.2	18	0.29 C <sup>(10)</sup>	390 (10)	Yes	ASL
		Chromium	2.2 J 1.1 J	60.2 25	mg/kg	DSY-S-TP09-0910	15/16	3.9 - 3.9	25	17	2.3 N	NA	Yes	ASL
	7440-48-4 7440-50-8	Cobalt	4.1	46.1	mg/kg mg/kg	DSY-S-TP08-0406	16/16		46.1	24	310 N	3,100	No	BSL
	7439-89-6		4.060	50,000	ma/ka	DSY-S-TP09-0910	16/16	<del>                                     </del>	50.000	39,173	5,500 N	NA NA	Yes	ASL
	7439-89-6	Lead	4,060 1.5 J	75 J	mg/kg	DSY-S-TP26-0406	15/16	1.3 - 1.3	75	12	400	150	No	BSL
		Magnesium	534	8,600	mg/kg	DSY-S-TP09-0910	16/16	1.0-1.0	8,600	3.811	NA NA	NA NA	No	NUT
		Manganese	78.6 J	2,450	mg/kg	DSY-S-TP09-0910	16/16		2,450	1,037	180 N	390	Yes	ASL
	7439-90-5		0.06	0.06	mg/kg	DSY-S-TP26-0406	1/16	0.05 - 0.06	0.06	0.012	2.3 N <sup>(11)</sup>	23	No	BSL
	7440-02-0		2.3 J	48.1	mg/kg	DSY-S-TP09-0910	15/16	7.2 - 7.2	48.1	28	150 N	1,000	No	BSL
	Metals (Cor			40.1	i ilig/ng	201-0-11 03-0310	1. 10/10	1.2-1.2	L		10011	.,,,,,		
		TPotassium	108	593	mg/kg	DSY-S-MW09-2022	16/16	I -	593	1.699	NA NA	NA NA	No	NUT, BKG
	7782-49-2		0.81 J	1.4 J	mg/kg	DSY-S-TP09-0406	2/16	0.68 - 0.92	1.4	0.286	39 N	390	No	BSL.
	7440-22-4		1.6 J	1.6 J	mg/kg	DSY-S-TP09-0910	1/16	1 - 1.4	1.6	0.12	39 N	200	No	BSL
	7440-23-5		14.5 J	353	mg/kg	DSY-S-TP08-0910	9/15	17 - 68.8	353	83	NA	NA	No	NUT
		Vanadium	4.4 J	19.6 J	mg/kg	DSY-S-TP09-0406	16/16	-	19.6	23	39 N	550	No	BSL, BKG
	7440-66-6		10 J	158	mg/kg	DSY-S-TP08-0406	16/16	-	158	66	2,300 N	6,000	No	B\$L
		ous Parameters												
	1461 25 2	Tetrabutyltin	2.9 J	2.9 J	ug/kg	DSY-S-TP08-0910	1/10	49 - 50	2.9	NA	1,800 N <sup>(12)</sup>	NA NA	No	BSL

### TABLE 2.11

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 Value is for pyrene.
- 10 Value is for hexavalent chromium.
- 11 Value is for mercuric chloride (and other mercury salts).
- 12 Value is for dibutylin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Associated Samples**

moodonatoa oampie	•
DSY-S-MW08-0810	DSY-S-TP08-0910
DSY-S-MW09-1012	DSY-S-TP09-0406
DSY-S-MW09-1012-	D DSY-S-TP09-0910
DSY-S-MW09-2022	DSY-S-TP10-0507
DSY-S-MW09-3032	DSY-S-TP10-1213
DSY-S-MW09-3638	DSY-S-TP26-0305
DSY-SB-04-0406	DSY-S-TP26-0406
DSY-SB-06-0204	DSY-S-TP26-0910
DSY-S-TP08-0406	

### Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

### Rationale Codes:

For selection as a COPC: ASL = Above Screening Level.

For elimination as a COPC: BKG = Within Background Levels BSL = Below COPC Screening Level NTX = No toxicity criteria NUT = Essential nutrient

## TABLE 2.12 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Groundwater Exposure Medium: Groundwater PAGE 1 OF 2

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
Former uilding 234	75-35-4	anic Compounds 1,1-Dichloroethene	0.25 J	0.25 J	ug/L	DSY-GW-MW08-030111	1/4	10 - 10	0.25	NA	26 N	7	EPA-MCL RIDEM	No	BSL
	156-59-2	cis-1,2-Dichloroethene	12.7	12.7	ug/L	DSY-GW-MW08-030111	1/1	-	12.7	NA	2.8 N	70 70	EPA-MCL RIDEM	Yes	ASL
	79-01-6	Trichloroethene	3 J	<b>4</b> J	ug/L	DSY-A-MW08-01	3/4	10 - 10	4	NA	0.26 N <sup>(7)</sup>	5 5	EPA-MCL RIDEM	Yes	ASL
	75-69-4	Trichlorofluoromethane	0.581 J	0.581 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.581	NA	110 N	NA NA	NA NA	No	BSL
		Vinyl Chloride	0.263 J	100	ug/L	DSY-A-MW104-01	2/4	10 - 10	100	NA	0.015 C	2 2	EPA-MCL RIDEM	Yes	ASL
	Metals (Total		50.7	1,010	un/l	DSY-A-MW09-01	2/4	33.7 - 102	1,010	l NA	1,600 N	50 - 200	EPA-SDWR	Yes	ASL
	7429-90-5	Aluminum	53.7	1,010	ug/L	DST-A-MW09-01	24	33.7 - 102	1,010	l NA	1,000 14	NA	NA	165	AGE
	7440-38-2	Arsenic	1.32 J	19.8	ug/L	DSY-A-MW104-01	3/4	4 - 4	19.8	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
	7440-39-3	Barium	17	99.3	ug/L	DSY-A-MW09-01	3/4	11.5 - 33.9	99.3	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
		Cadmium	0.286 J	0.286 J	ug/L	DSY-GW-MW08-030111	1/4	3-3	0.286	NA	0.69 N	5 5	EPA-MCL RIDEM	No	BSL
	7440-70-2		28,400	46,900	ug/L	DSY-A-MW104-01	4/4	-	46,900	NA	NA	NA NA	NA NA	No	NUT
		Chromium	7.2 J	57.6 J	ug/L	DSY-A-MW09-01	3/4	1 - 1	57.6	NA NA	0.031 C	100 100 NA	EPA-MCL RIDEM	Yes	ASL ASL
	7440-48-4		1.74 J	1.74 J	ug/L	DSY-GW-MW08-030111	1/4	3.4 - 18.5	1.74	NA NA	0.47 N 62 N	NA NA 1,300	NA NA EPA-SDWR	Yes	BSL
	7440-50-8	Copper	1.57 J	12.7	ug/L	DSY-A-MW104-01	3/4	5 - 5	12.7	NA NA	·	NA	NA		BOL
	7439-89-6	Iron	459	5,660	ug/L	DSY-A-MW08-01	4/4	140 - 140	5,660	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
	7439-92-1	Lead	14.6	14.6	ug/L	DSY-A-MW104-01	1/4	0.75 - 1	14.6	NA	NA	15 15	EPA-MCL RIDEM	No	BSL
	7439-95-4	Magnesium	6,530	13,400	ug/L	DSY-A-MW08-01-D	4/4	-	13,400	NÀ	NA	NA NA	NA NA	No	NUT
	7439-96-5	Manganese	20.5	4,300	ug/L	DSY-A-MW104-01	4/4	-	4,300	NA	32 N	50 NA	EPA-SDWR NA	Yes	ASL
	7440-02-0	Nickel	2.08 J	2.08 J	ug/L	DSY-GW-MW08-030111	1/4	9 - 34.6	2.08	NA	30 N	NA 100	NA RIDEM	No	BSL
		Potassium	1,440	7,650	ug/L	DSY-A-MW09-01	4/4	-	7,650	NA	NA	NA NA	NA NA	No	NUT
	7440-23-5	Sodium	32,000	119,000	ug/L	DSY-A-MW104-01	4/4	-	119,000	NÃ	NA	NA NA	NA NA	No	NUT
	7440-66-6	Zinc	29.8 J	29.8 J	ug/L	DSY-GW-MW08-030111	1/4	14.2 - 52.1	29.8	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
	7429-90-5		36.6 J	36.6 J	ug/L	DSY-GW-MW08-030111	1/1	-	36.6	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	No	BSL
	7440-38-2	Arsenic	1.37 J	1.37 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.37	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL.
	7440-39-3	Barium	16.1	16.1	ug/L	DSY-GW-MW08-030111	1/1	-	16.1	NA	290 N	2,000	EPA-MCL RIDEM	No	BSL
	7440-43-9	Cadmium	0.274 J	0.274 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.274	NA	0.69 N	5 5	EPA-MCL RIDEM	No	BSL
	7440-70-2	Calcium	47,800	47,800	ug/L	DSY-GW-MW08-030111	1/1	-	47,800	NA	NA	NA NA	NA NA	No	NUT
	7440-48-4	Cobalt	1.78 J	1.78 J	ug/L	DSY-GW-MW08-030111	1/1		1.78	NA	0.47 N	NA NA	NA NA	Yes	ASL
	7440-50-8	Copper	1.17 J	1.17 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.17	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL

### **TABLE 2.12**

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future Medium: Groundwater Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Above Background Concentration? <sup>(4)</sup>	Adjusted USEPA RSL Tapwater <sup>(5)</sup>	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(6)</sup>
	7439-89-6	iron	423	423	ug/L	DSY-GW-MW08-030111	1/1	-	423	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
	7439-95-4	Magnesium	9,790	9,790	ug/L	DSY-GW-MW08-030111	1/1	-	9,790	NA	NA	NA NA	NA NA	No	NUT
	7439-96-5	Manganese	531	531	ug/L	DSY-GW-MW08-030111	1/1	-	531	NA	32 N	50 NA	EPA-SDWR NA	Yes	ASL
	7440-02-0	Nickel	1.75 J	1.75 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.75	NA	30 N	NA 100	NA RIDEM	No	BSL
	7440-09-7	Potassium	5,010	5,010	ug/L	DSY-GW-MW08-030111	1/1	-	5,010	NA	NA	NA NA	NA NA	No	NUT
	7440-23-5	Sodium	114,000	114,000	ug/L	DSY-GW-MW08-030111	1/1		114,000	NA	NA	NA NA	NA NA	No	NUT
	7440-66-6	Zinc	16.6	16.6	ug/L	DSY-GW-MW08-030111	1/1	-	16.6	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
	Miscellaneo	us Parameters				t	•			•			•	•	
		Monobutyltin	0.16 J	0.16 J	ug/L	DSY-A-MW08-01-D	1/3	1 - 1	0.16	NA	NA	NA NA	NA NA	No	NTX

### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### Associated Samples

DSY-A-MW08-01 DSY-A-MW08-01-D DSY-A-MW09-01 DSY-A-MW104-01 DSY-GW-MW08-030111

### Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

CAS = Chemical Abstracts Service

COPC = Chemical Of Potential Concern

EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)

EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

RIDEM = Rhode Island Department of Environmental Management GA Groundwater Objective (February, 2004).

### Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:

BSL = Below COPC Screening Level

NTX = No toxicity criteria

## TABLE 2.13 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - FORMER BUILDING 234 FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future

Medium: Groundwater

Exposure Medium: Groundwater

g 234	75-35-4 156-59-2 79-01-6 75-69-4	anic Compounds 1,1-Dichloroethene cis-1,2-Dichloroethene Trichloroethene Trichlorofluoromethane Vinyl Chloride	0.25 J 12.7 3 J 0.581 J 0.263 J	0.25 J 12.7 4 J 0.581 J	ug/L ug/L ug/L	DSY-GW-MW08-030111 DSY-GW-MW08-030111	1/4	10 - 10							
,	156-59-2 79-01-6 75-69-4 75-01-4 <b>Metals</b> 7429-90-5	cis-1,2-Dichloroethene Trichloroethene Trichlorofluoromethane Vinyl Chloride	12.7 3 J 0.581 J	12.7 4 J 0.581 J	ug/L			40 40							
<u> </u>	79-01-6 75-69-4 75-01-4 <b>/letals</b> 7429-90-5	Trichloroethene Trichlorofluoromethane Vinyl Chloride	3 J 0.581 J	4 J 0.581 J		DSY-GW-MW08-030111		10 - 10	0.25	NA	20 N	NA	NA	No	BSL
	75-69-4 75-01-4 <b>Metals</b> 7429-90-5	Trichlorofluoromethane Vinyl Chloride	0.581 J	0.581 J	ug/L		1/1	-	12.7	NA	NA NA	NA	NA	No	NTX
	75-01-4 <b>/letals</b> 7429-90-5	Vinyl Chloride				DSY-A-MW08-01	3/4	10 - 10	4	NA	0.52 N <sup>(7)</sup>	NA	NA	Yes	ASL
	<b>letals</b> 7429-90-5	•	0.263 J		ug/L	DSY-GW-MW08-030111	1/1	-	0.581	NA	18 N	NA.	NA	No	BSL
	7429-90-5			100	ug/L	DSY-A-MW104-01	2/4	10 - 10	100	NA	0.14 C	NA	NA	Yes	ASL
	7440-38-2	Aluminum	53.7	1,010	ug/L	DSY-A-MW09-01	2/4	33.7 - 102	1,010	NA	NA	NA.	NA	No	NTX
		Arsenic	1.32 J	19.8	ug/L	DSY-A-MW104-01	3/4	4 - 4	19.8	NA	NA NA	NA	NA	No	NTX, BKG
	7440-39-3	Barium	17	99.3	ug/L	DSY-A-MW09-01	3/4	11.5 - 33.9	99.3	NA	NA	NA	NA	No	NTX
Г	7440-43-9	Cadmium	0.286 J	0.286 J	ug/L	DSY-GW-MW08-030111	1/4	3 - 3	0.286	NA NA	NA	NA	NA	No	NTX
	7440-70-2	Calcium	28,400	46,900	ug/L	DSY-A-MW104-01	4/4	-	46,900	NA NA	NA	NA	NA	No	NUT
	7440-47-3	Chromium	7.2 J	57.6 J	ug/L	DSY-A-MW09-01	3/4	1 - 1	57.6	NA	NA	NA	NA	No	NTX
	7440-48-4		1.74 J	1.74 J	ug/L	DSY-GW-MW08-030111	1/4	3.4 - 18.5	1.74	NA	NA	NÁ	NA	No	NTX
	7440-50-8	Copper	1.57 J	12.7	ug/L	DSY-A-MW104-01	3/4	5 - 5	12.7	NA	NA	NA	NA	No	NTX
	7439-89-6	Iron	459	5,660	ug/L	DSY-A-MW08-01	4/4	140 - 140	5,660	NA NA	NA	NA	NA	No	NTX
Г	7439-92-1	Lead	14.6	14.6	ug/L	DSY-A-MW104-01	1/4	0.75 - 1	14.6	NA	NA	NA NA	NA	No	NTX
	7439-95-4	Magnesium	6,530	13,400	ug/L	DSY-A-MW08-01-D	4/4	-	13,400	NA	NA NA	NA NA	NA	No	NUT
	7439-96-5	Manganese	20,5	4,300	ug/L	DSY-A-MW104-01	4/4		4,300	NA	NA	NA	NA	No	NTX
	7440-02-0	Nickel	2.08 J	2.08 J	ug/L	DSY-GW-MW08-030111	1/4	9 - 34.6	2.08	NA	NA	NA	NA	No	NTX
	7440-09-7	Potassium	1,440	7,650	ug/L	DSY-A-MW09-01	4/4	-	7,650	NA	NA	NA	NA	No	NUT
	7440-23-5	Sodium	32,000	119,000	ug/L	DSY-A-MW104-01	4/4		119,000	NA	NA	NA .	NA	No	NUT
	7440-66-6	Zinc	29.8 J	29.8 J	ug/L	DSY-GW-MW08-030111	1/4	14.2 - 52.1	29.8	NA	NA	NA	NA	No	NTX
□	Dissolved M	etals													
	7429-90-5	Aluminum	36.6 J	36.6 J	ug/L	DSY-GW-MW08-030111	1/1		36.6	NA	NA NA	NA	NA	No	NTX
	7440-38-2	Arsenic	1.37 J	1.37 J	υg/L	DSY-GW-MW08-030111	1/1	-	1.37	NA	NA NA	NA	NA	No	NTX, BKG
	7440-39-3	Barium	16.1	16.1	ug/L	DSY-GW-MW08-030111	1/1	-	16.1	NA	NA	NA	NA	No	NTX
	7440-43-9	Cadmium	0.274 J	0.274 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.274	NA	NA	NA	NA	No	NTX
	7440-70-2	Calcium	47,800	47,800	ug/L	DSY-GW-MW08-030111	1/1	-	47,800	NA	NA	NA	NA	No	NUT
	7440-48-4	Cobalt	1.78 J	1.78 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.78	NA NA	NA	NA	NA	No	NTX
-	7440-50-8	Copper	1.17 J	1.17 J	ug/L	DSY-GW-MW08-030111	1/1	-	1,17	NA NA	NA	NA	NA	No	NTX
		Iron	423	423	ug/L	DSY-GW-MW08-030111	1/1	-	423	NA	NA	NA	NA	No	NTX
		Magnesium	9,790	9,790	ug/L	DSY-GW-MW08-030111	1/1	-	9,790	NA	NA	NA	NA	No	NUT
		Manganese	531	531	ug/L	DSY-GW-MW08-030111	1/1		531	NA NA	NA NA	NA	NA	No	NTX
	7440-02-0		1.75 J	1.75 J	ug/L	DSY-GW-MW08-030111	1/1		1.75	NA NA	NA	NA	NA.	No	NTX
	7440-09-7		5.010	5.010	ug/L	DSY-GW-MW08-030111	1/1	-	5,010	NA NA	NA NA	NA NA	NA.	No	NUT
	7440-23-5		114,000	114,000	ug/L	DSY-GW-MW08-030111	1/1	-	114,000	NA NA	NA NA	NA.	NA NA	No	NUT
	7440-25-5		16.6	16.6	ug/L	DSY-GW-MW08-030111	1/1		16.6	NA NA	NA NA	NA.	NA.	No	NTX
		us Parameters	10.0	10.0	ug/L	201-011-1111100-000111	1 1/1	L	10.0	1 1313	14/1	1 1773	1373		
۳		Monobutvitin	T 0.16 J	0.16 J	ua/L	DSY-A-MW08-01-D	1/3	1 - 1	0.16	I NA	NA	NA NA	I NA	No	NTX

### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 No background data is available for groundwater.
- 5 USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
- Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Associated Samples**

DSY-A-MW08-01 DSY-A-MW08-01-D DSY-A-MW09-01

### Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

CAS = Chemical Abstracts Service

COPC = Chemical Of Potential Concern

J = Estimated value

NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC: ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels
BSL = Below COPC Screening Level

NTX = No toxicity criteria

### **TABLE 2.14**

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - SOUTH WATERFRONT FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Subsurface Soil

Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(6)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
South	Polycyclic A	romatic Hydrocarbons												
Waterfront	205-99-2	Benzo(b)fluoranthene	43 J_	43 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	43	NA	150 C	900	No	BSL
	206-44-0	Fluoranthene	59 J	59 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	59	NA	230,000 N	20,000	No	BSL
1	129-00-0	Pyrene	67 J	67 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	67	NA	170,000 N	13,000	No	BSL
	Metals													
	7429-90-5	Aluminum	5,860	17,400	mg/kg	DSY-SB201-SO-0204	6/6		17400	13075	7,700 N	NA NA	Yes	ASL
	7440-38-2	Arsenic	7.7 J	26.3	mg/kg	DSY-SB202-SO-0204	6/6		26.3	20	0.39 C	7	Yes	ASL
	7440-39-3	Barium	13.9	18 J	mg/kg	DSY-S-TP02-1516	5/6	2.9 - 2.9	18	36	1,500 N	5,500	No	BSL, BKG
	7440-41-7	Beryllium	0.34 J	0.418 J	mg/kg	DSY-SB201-SO-0204	5/6	0.21 - 0.21	0.418	0.64	16 N	1.5	No	BSL, BKG
	7440-43-9	Cadmium	0.56 J	0.56 J	mg/kg	DSY-S-TP06-1213	1/6	0.214 - 0.63	0.56	0.23	7 N	39	No .	BSL
	7440-70-2	Calcium	812	3,490	mg/kg	DSY-S-TP02-1516	6/6	·	3490	1689	NA	NA NA	No	NUT
	7440-47-3	Chromium	6.6 J	21.2	mg/kg	DSY-SB201-SO-0204	6/6	-	21.2	18	0.29 C <sup>(8)</sup>	390 <sup>(8)</sup>	Yes	ASL
	7440-48-4	Cobalt	4.4 J	29.9	mg/kg	DSY-S-TP05-1213	6/6	-	29.9	17	2.3 N	NA NA	Yes	ASL
	7440-50-8	Copper	7 J	29.9 J	mg/kg	DSY-SB201-SO-0204	6/6	-	29.9	24	310 N	3,100	No	BSL
	7439-89-6		16,800	45,500	mg/kg	DSY-SB202-SO-0204	6/6		45500	39173	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	7.6 J	34.2 J	mg/kg	DSY-S-TP02-1516	6/6		34.2	12	400	150	No	BSL
	7439-95-4	Magnesium	2,230	5,220	mg/kg	DSY-SB201-SO-0204	6/6	-	5220	3811	NA	NA	No	NUT
	7439-96-5	Manganese	104 J	800	mg/kg	DSY-S-TP05-1213	6/6	-	800	1,037	180 N	390	No	BKG
	7440-02-0	Nickel	10.7 J	38.6	mg/kg	DSY-SB201-SO-0204	6/6		38.6	28	150 N	1,000	No	BSL
1	7440-09-7	Potassium	121 J	365	mg/kg_	DSY-S-TP05-1213	6/6		365	1,699	NA	NA	No	NUT, BKG
	7440-23-5	Sodium	9 J	23 J	mg/kg	DSY-S-TP05-1213	2/6	36.7 - 342	23	83	NA	NA	No	NUT, BKG
	7440-62-2	Vanadium	9	18.6	mg/kg	DSY-SB201-SO-0204	6/6	-	18,6	23	39 N	550	No	BSL, BKG
l l	7440-66-6		52.5 J	75.7 J	mg/kg	DSY-SB202-SO-0204	6/6	-	75.7	66	2,300 N	6,000	No	BSL

### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for hexavalent chromium.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Associated Samples**

DSY-SB201-SO-0204 DSY-SB202-SO-0204 DSY-S-TP01-1112 DSY-S-TP02-1516

DSY-S-TP05-1213 DSY-S-TP06-1213

### Definitions:

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

### Rationale Codes:

For selection as a COPC: ASL = Above Screening Level.

For elimination as a COPC: BKG = Within Background Levels BSL = Below COPC Screening Level NTX = No toxicity criteria NUT = Essential nutrient

## TABLE 2.15 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future Medium: Surface Soil Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(5)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
PCB	Polycyclic a	Aromatic Hydrocarbons												
Removal	91-57-6	2-Methylnaphthalene	18.8 J	299	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	299	NA .	23,000 N	123,000	No	BSL
Area	83-32-9	Acenaphthene	10 J	1,000	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	1,000	NA	340,000 N	43,000	No	BSL
	208-96-8	Acenaphthylene	695	695	ug/kg	DSY-SO-SB209-0.30.7	1/3	3.94 - 360	695	NA	340,000 N <sup>(8)</sup>	23,000	No	BSL
	120-12-7	Anthracene	45.1 J	2,290	ug/kg	DSY-SO-SB209-0.30.7	2/3	3.94 - 360	2,290	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	42 J	5,740	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	5,740 4,920	NA NA	150 C 15 C	900 400	Yes	ASL ASL
	50-32-8	Benzo(a)pyrene	46.3 J 50 J	4,920 7,120	ug/kg	DSY-SO-SB209-0.30.7 DSY-SO-SB209-0.30.7	4/4	-	7,120	NA NA	150 C	900	Yes Yes	ASL
	205-99-2	Benzo(b)fluoranthene			ug/kg		3/3		2.070	NA NA	170,000 N <sup>(9)</sup>	800	Yes	ASL
	191-24-2	Benzo(g,h,i)perylene	28.4 J	2,070	ug/kg	DSY-SO-SB209-0.30.7	3/3		2,070	NA NA	1,500 C	900	Yes	ASL
	207-08-9	Benzo(k)fluoranthene	28.8 J	2,480 5,650	ug/kg	DSY-SO-SB209-0.30.7 DSY-SO-SB209-0.30.7	4/4	-	5.650	NA NA	15.000 C	400	Yes	ASL
	218-01-9	Chrysene	45 J 10.1 J	820	ug/kg ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	820	NA NA	15,000 C	400	Yes	ASL
	53-70-3	Dibenzo(a,h)anthracene Fluoranthene	82 J	13,400	ug/kg ug/ka	DSY-SO-SB209-0.30.7	4/4	360 - 360	13,400	NA NA	230,000 N	20,000	No	BSL
	86-73-7	Fluoranmene	6.3 J	1,220	ug/kg ug/ka	DSY-SO-SB209-0.30.7	2/3	360 - 360	1,220	NA NA	230,000 N	28,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	23.5 J	2.070	ug/kg ug/ka	DSY-SO-SB209-0.30.7	3/3	300 - 300	2,070	NA NA	150 C	900	Yes	ASL
	91-20-3	Naphthalene	14.7 J	751	ug/kg ug/ka	DSY-SO-SB209-0.30.7	2/3	360 - 360	751	NA NA	3,600 C	54,000	No	BSL
	85-01-8	Phenanthrene	60 J	9,530	ug/kg	DSY-SO-SB209-0.30.7	4/4		9,530	NA NA	170,000 N <sup>(9)</sup>	40.000	No	BSL
	129-00-0	Pyrene	58 J	10.100	ug/kg	DSY-SQ-SB209-0.30.7	4/4	-	10,100	NA NA	170,000 N	13.000	No	BSL
	Pesticides/		J 30 0	10,100	ugritg	DO1 00 0D200 0.00.1	1 77 -	·	10,100			15,000		
		Aroclor-1260	24.2 J	416 J	ug/kg	DSY-SO-SB209-0.30.7	2/7	17.2 - 36	416	NA NA	220 C	NA	Yes	ASL
		Total Aroclors	24.2 J	416 J	ua/ka	DSY-SO-SB209-0.30.7	2/6	17.2 - 18.1	416	NA NA	220 C	10.000	Yes	ASL
	Metals	TOTAL PRODUCTS	2 112 0		ugg		1							
		Aluminum	9.120	12,300	mg/kg	DSY-S-MW06-SS01	3/3	-	12,300	16,020	7,700 N	NA	No	BKG
	7440-38-2		10.4	21.8 J	mg/kg	DSY-SO-SB208-000.5	4/4	-	21.8	13	0.39 C	7	Yes	ASL
	7440-39-3	Barium	14.8 J	35.4 J	mg/kg	DSY-SO-SB208-000.5-D	4/4	-	35.4	51	1,500 N	5,500	No	BSL, BKG
	7440-41-7	Beryllium	0.45	0.576	mg/kg	DSY-SO-SB208-000.5-D	3/3	-	0.576	0.58	16 N	1.5	No	BSL, BKG
	7440-43-9	Cadmium	0.232 J	1.4	mg/kg	B6-S1	2/4	0.122 - 0.61	1.4	0.17	. 7 N	39	No	BSL
	7440-70-2	Calcium	416 J	1,180	mg/kg	DSY-S-MW06-SS01	3/3	-	1,180	1,598	NA	NA	No	NUT, BKG
	7440-47-3	Chromium	10 J	15.8 J	mg/kg	DSY-S-MW06-SS01	4/4	-	15.8	16	0.29 C(10)	390 (10)	No	BKG
		- 1.5	8.62 J	22.7	mg/kg	DSY-S-MW06-SS01	3/3	-	22.7	9	2.3 N	NA	Yes	ÁSL
	7440-50-8		23.4 J	33.5 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	-	33.5	12.4	310 N	3,100	No	BSL
	7439-89-6	Iron	22,500	32,000	mg/kg	DSY-SO-SB208-000.5	3/3	-	32,000	24,200	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	16.4 J	26.5 J	mg/kg	DŚY-SO-SB209-0.30.7	4/4	-	26.5	40	400	150	No	BSL, BKG
		Magnesium	2.840	4.090	mg/kg	DSY-S-MW06-SS01	3/3	-	4,090	2,571	NA	NA NA	No	NUT
			293	619	mg/kg	DSY-S-MW06-SS01	3/3	-	619	349	180 N	390	Yes	ASL
	7439-97-6	Mercury	0.0168 J	0.0247 J	ma/ka	DSY-SO-SB208-000.5	2/3	0.0359 - 0.05	0.0247	0.18	2.3 N <sup>(11)</sup>	23	No	BSL, BKG
	7440-02-0		21.1	26.3	mg/kg	DSY-SO-SB208-000.5-D	3/3	-	26.3	15	150 N	1,000	No	BSL
	7440-02-0		282	394 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	904 - 904	394	651	NA NA	NA NA	No	NUT, BKG
	7782-49-2		0.301 J	0.631	mg/kg	DSY-SO-SB208-000.5-D	2/3	0.82 - 1.51	0.631	0.57	39 N	390	No	BSL
	7440-23-5		71.4 J	71.4 J	mg/kg	DSY-SO-SB209-0.30.7	1/2	182 - 904	71.4	231	NA NA	NA NA	No	NUT, BKG
		Vanadium	14.2	25.1	mg/kg	DSY-SO-SB208-000.5	3/3		25.1	34	39 N	550	No	BSL, BKG
	7440-66-6		75.5 J	137 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	<del>-</del>	137	62	2.300 N	6,000	No	BSL

### **TABLE 2.15**

## OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for acenaphthene.
- 9 Value is for pyrene.
- 10 Value is for hexavalent chromium.
- 11 Value is for mercuric chloride (and other mercury salts).

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Associated Samples**

DSY-S-MW06-SS01

DSY-SO-SB208-000.5

DSY-SO-SB208-000.5-D

DSY-SO-SB209-0.30.7

DSY-SO-SB215-000.5

DSY-SO-SB216-000.5

DSY-SO-SB217-000.5

DSY-SO-SB224-000.5

DSY-SO-SB224-000.5-D

B6-S1

### Definitions:

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

### Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

# TABLE 2.16 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Current/Future Medium: Subsurface Soil Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration <sup>(1)</sup>	Maximum Concentration <sup>(1)</sup>	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects <sup>(2)</sup>	Concentration Used for Screening <sup>(3)</sup>	Background Concentration <sup>(4)</sup>	Adjusted USEPA RSL Residential Soil <sup>(6)</sup>	RIDEM Residential Direct Exposure Criteria <sup>(6)</sup>	COPC Flag	Rationale for Contaminant Deletion or Selection <sup>(7)</sup>
PCB	Polycyclic A	Aromatic Hydrocarbons		· · · · · · · · · · · · · · · · · · ·										
Removal	91-57-6	2-Methylnaphthalene	3.38 J	281	ug/kg	DSY-SO-SB214-0203	3/6	3.83 - 360	281	NA	23,000 N	123,000	No	BSL
Area	83-32-9	Acenaphthene	2.87 J	2.87 J	ug/kg	DSY-SO-SB213-0203	1/6	3.53 - 360	2.87	NA NA	340,000 N	43,000	No	BSL
	208-96-8	Acenaphthylene	3.5 J	47.2	ug/kg	DSY-SO-SB214-0203	4/6	3.9 - 360	47.2	NA	340,000 N <sup>(8)</sup>	23,000	No	BSL
	120-12-7	Anthracene	4.71 J	17.2	ug/kg	DSY-SO-SB212-0204	3/6	4.11 - 360	17.2	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	32.5	252	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	252	NA	150 C	900	Yes	ASL
	50-32-8	Benzo(a)pyrene	18.9	172	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	172	NA	15 C	400	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	26.6	336	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	336	NA	150 C	900	Yes	ASL
	191-24-2	Benzo(g,h,i)perylene	10.7 J	91.1	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	91.1	NA NA	170,000 N <sup>(9)</sup>	800	No.	BSL
	207-08-9	Benzo(k)fluoranthene	11.3 J	124	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	124	NA NA	1,500 C	900	No	B\$L B\$L
	218-01-9	Chrysene	20.5	356	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	356	NA NA	15,000 C	400 400	No	ASL
	53-70-3	Dibenzo(a,h)anthracene	7.48 J 39.6	43.7	ug/kg	DSY-SO-SB214-0203 DSY-SO-SB214-0203	3/6 6/7	3.83 - 360 360 - 360	43.7 451	NA NA	15 C 230,000 N	20.000	Yes No	BSL
	206-44-0 86-73-7	Fluoranthene Fluorene	2,22 J	451 8.85 J	ug/kg ug/ka	DSY-SO-SB214-0203	3/6	4.11 - 360	8.85	NA NA	230,000 N	28,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	10.2 J	82.7	ug/kg ug/ka	DSY-SO-SB214-0203	5/6	360 - 360	82.7	NA NA	150 C	900	No	BSL
	91-20-3	Naphthalene	2.5 J	175	ug/kg ug/ka	DSY-SO-SB214-0203	4/6	3.9 - 360	175	NA NA	3,600 C	54,000	No	BSL
	85-01-8	Phenanthrene	24.8	400	ua/ka	DSY-SO-SB214-0203	6/7	360 - 360	400	NA NA	170,000 N <sup>(9)</sup>	40,000	No	BSL
	129-00-0		33.9	375	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	375	NA NA	170,000 N	13,000	No	BSL
	Pesticides/		00.0	0/0	ugrkg	DO1 00 0D214 0200		1 000 000	0.0	I <u>- /</u>	110,000 11	10,000	1	
		Total Aroclors	95	95	ug/kg	B6-S6	1/6	17.2 - 26.9	95	NA NA	220 C	10.000	No	BSL
	Metals	7 014.7 11 001010	1 00		~ <u>a</u> · <u>a</u>									
	7429-90-5	Aluminum	2,180	19,900	mg/kg	DSY-S-MW06-0406	6/6	-	19,900	13,075	7,700 N	NA	Yes	ASL
	7440-36-0		1.15 J	1.15 J	mg/kg	DSY-SO-SB214-0203	1/6	0.428 - 17.6	1.15	ND	3.1 N	10	No	BSL
	7440-38-2	Arsenic	1.47 J	47.2 J	mg/kg	DSY-SO-SB214-0203	7/7		47.2	20	0.39 C	7	Yes	ASL
	7440-39-3	Barium	5.5 J	57.7 J	mg/kg	DSY-SO-SB214-0203	6/6	-	57.7	36	1,500 N	5,500	No	BSL
	7440-41-7	Beryllium	0.507 J	0.759	mg/kg	DSY-SO-SB214-0203	5/6	0.34 - 0.34	0.759	0.64	16 N	1.5	No	BSL
	7440-43-9	Cadmium	0.0903 J	1.4	mg/kg	B6-S6	2/7	0.107 - 1	1.4	0.23	7 N	39	No	BSL
	7440-70-2	Calcium	279 J	2,040 J	mg/kg	DSY-SO-SB214-0203	6/6	-	2,040	1,689	NA	NA NA	No	NUT
	7440-47-3	Chromium	0.788 J	25.6 J	mg/kg	DSY-S-MW06-0406	7/7	-	25.6	18	0.29 C <sup>(10)</sup>	390 (10)	Yes	ASL
	7440-48-4	Cobalt	1.29 J	24	mg/kg	DSY-S-MW06-0406	6/6	-	24	17	2.3 N	NA	Yes	ASL
	7440-50-8	Copper	1.67 J	39.5 J	mg/kg	DSY-SO-SB214-0203	6/6	-	39.5	24	310 N	3,100	No	BSL
	7439-89-6	Iron	6,800	43,600	mg/kg	DSY-S-MW06-0406	6/6		43,600	39,173	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	2.49 J	81.4 J	mg/kg	DSY-SO-SB214-0203	7/7	-	81.4	12	400	150	No	BSL
	7439-95-4	Magnesium	646	7,130	mg/kg	DSY-S-MW06-0406	6/6	-	7,130	3,811	NA	NA	No	NUT
	7439-96-5	Manganese	305	1,190	mg/kg	DSY-SO-SB214-0203	6/6	-	1,190	1,037	180 N	390	Yes	ASL
	7439-97-6	Mercury	0.0138 J	0.0603	mg/kg	DSY-SO-SB214-0203	3/6	0.0276 - 0.05	0.0603	0.012	2.3 N <sup>(11)</sup>	23	No	BSL
	7440-02-0		0.596	39.7	mg/kg	DSY-S-MW06-0406	6/6	· -	39.7	28	150 N	1,000	No	BSL
		Potassium	166	681 J	mg/kg	DSY-SO-SB212-0204	6/6	-	681	1,699	NA	NA	No	NUT, BKG
	7782-49-2	· <u></u>	0.67	1.31	mg/kg	DSY-SO-SB214-0203	2/6	0.268 - 1.49	-1.31	0.286	39 N	390	No	BSL
	7440-23-5		90.6 J	90.6 J	mg/kg	DSY-SO-SB214-0203	1/5	161 - 179	90.6	83	NA	NA	No	NUT
		Vanadium	3.97	20.6	mg/kg	DSY-SO-SB213-0203	6/6	-	20.6	23	39 N	550	No	BSL, BKG
	7440-66-6		27.1 J	335 J	mg/kg	DSY-SO-SB214-0203	6/6	· -	335	66	2,300 N	6,000	No	BSL

## TABLE 2.16 OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - PCB REMOVAL AREA FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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### Footnotes:

- 1 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 Values presented are sample-specific quantitation limits.
- 3 The maximum detected concentration is used for screening purposes.
- 4 Background concentration is upper prediction limit. See Appendix G.
- 5 USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 Value is for acenaphthene.
- 9 Value is for pyrene.
- 10 Value is for hexavalent chromium.
- 11 Value is for mercuric chloride (and other mercury salts).

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

### **Associated Samples**

DSY-S-MW06-0406

DSY-SO-SB210-0102

DSY-SO-SB211-0102

DSY-SO-SB212-0204

DSY-SO-SB213-0203 DSY-SO-SB214-0203

B6-S6

### Definitions:

C = Carcinogen COPC = Chemical Of Potential Concern J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

### Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level and site background.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

### RAGS Part D Table 3

**Medium-Specific Exposure Point Concentration Summary** 

## LIST OF TABLES RAGS PART D TABLE 3 MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

### Table No.

3.1.RME	Unpaved Surface Soil - North Waterfront
3.2.RME	Surface Soil - North Waterfront
3.3.RME	Subsurface Soil - North Waterfront
3.4.RME	Groundwater - North Waterfront
3.5.RME	Unpaved Surface Soil - Central Shipyard
3.6.RME	Surface Soil - Central Shipyard
3.7.RME	Subsurface Soil - Central Shipyard
3.8.RME	Groundwater - Central Shipyard
3.9.RME	Unpaved Surface Soil - Former Building 234
3.10.RME	Surface Soil - Former Building 234
3.11.RME	Subsurface Soil - Former Building 234
3.12.RME	Groundwater - Former Building 234
3.13.RME	Subsurface Soil - South Waterfront
3.14.RME	Unpaved Surface Soil - PCB Removal Area
3.15.RME	Surface Soil - PCB Removal Area
3.16.RME	Subsurface Soil - PCB Removal Area

# TABLE 3.1.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
	, 0.0			(2.0)	(=====,				
Unpaved	Benzo(a)anthracene	mg/kg	(1)	(1)	0.232	0.232	mg/kg	Maximum Detected Concentration	(1)
North Waterfront	Benzo(a)pyrene	mg/kg	(1)	(1)	0.165	0.165	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
Surface Soil	Benzo(b)fluoranthene	mg/kg	(1)	(1)	0.263	0.263	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
	Chrysene	mg/kg	(1)	(1)	0.238	0.238	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.124	0.124	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
ll .	Indeno(1,2,3-cd)pyrene	mg/kg	(1)	(1)	0.099	0.099	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
1	Chromium VI	mg/kg	8.73	10.8 (G)	16.1	10.8	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL 4.1.01
1	Cobalt	mg/kg	5.46	7.0 (N)	9.56	7.0	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Iron	mg/kg	15,125	18,800 (NP)	27,100	18,800	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
ŀ	Manganese	mg/kg	170.9	229 (N)	337	229	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma

L = Lognormal

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

# TABLE 3.2.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point		Units	Arithmetic	95% UCL	Maximum Concentration		1	Exposure Point Concentration	
	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale
North Waterfront	Benzo(a)anthracene	mg/kg	0.486	0.207 (N)	0.61	0.207	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(a)pyrene	mg/kg	0.479	0.161 (N)	0.53	0.161	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(b)fluoranthene	mg/kg	0.500	0.251 (N)	0.805	0.251	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Chrysene	mg/kg	0.489	0.209 (N)	0.58	0.209	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.124	0.124	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
	Indeno(1,2,3-cd)pyrene	mg/kg	0.467	0.109 (N)	0.38	0.109	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	8.7	13.5 (G)	24.1	13.5	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.1.01
	Cobalt	mg/kg	6.5	7.9 (N)	14.7	7.9	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Iron	mg/kg	15,774	17,425 (G)	27,100	17,425	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

# TABLE 3.3.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Subsurface Soil

Exposure Medium: Subsurface Soil

Exposure Point	Chemical of	Units	Arithmetic	95% UCL	Maximum Concentration			Exposure Point Concentration	
	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale
North Waterfront	Benzo(a)pyrene	mg/kg	(1)	(1)	0.044	0.044	mg/kg	Maximum Detected Concentration	(1)
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.0233	0.0233	mg/kg	Maximum Detected Concentration	(1)
	Aluminum	mg/kg	6420	7,510 (G)	18,200	7,510	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	9.48	11.0 (G)	27.1	11	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01
	Cobalt	mg/kg	7.13	8.68 (G)	19.8	8.68	mg/kg	95% KM (BCA) UCL	ProUCL 4.1.01
	Iron	mg/kg	17,600	20,100 (G)	44,400	20,100	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

## TABLE 3.4.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future

Medium: Groundwater

Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
North Waterfront	cis-1,2-Dichloroethene	ug/L	1.2	2.3 (N)	4.26	4.26	ug/L	Maximum Detected Concentration	(1)
	Trichloroethene (Mutagenic)	ug/L	4.8	7.9 (N)	12.2	12.2	ug/L	Maximum Detected Concentration	(1)
l	Trichloroethene (Nonmutagenic)	ug/L	4.8	7.9 (N)	12.2	12.2	ug/L	Maximum Detected Concentration	(1)
	Vinyl Chloride	ug/L	(2)	(2)	1.47	1.47	ug/L	Maximum Detected Concentration	(1)
	Aluminum	ug/L	(3)	(3)	337	337	ug/L	Maximum Detected Concentration	(1)
1	Chromium VI	ug/L	(3)	(3)	0.508	0.508	ug/L	Maximum Detected Concentration	(3)
	Iron	ug/L	(3)	(3)	605	605	ug/L	Maximum Detected Concentration	(3)
	Manganese	ug/L	(3)	(3)	53.9	53.9	ug/L	Maximum Detected Concentration	(3)

G - Gamma distribution.

N - Normal distribution.

NP = Nonparametric distribution.

- 1 There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.
- 2 The maximum detected concentration is used as the exposure point concentration for groundwater.
- 3 There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

# TABLE 3.5.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
Unpaved	Arsenic	mg/kg	(1)	(1)	24.4	24.4	mg/kg	Maximum Detected Concentration	(1)
Cental Shipyard	Chromium VI	mg/kg	(1)	(1)	15.8	15.8	mg/kg	Maximum Detected Concentration	(1)
	Cobalt	mg/kg	(1)	(1)	14.7	14.7	mg/kg	Maximum Detected Concentration	(1)
	Iron	mg/kg	(1)	(1)	31,800	31,800	mg/kg	Maximum Detected Concentration	(1)
	Manganese	mg/kg	(1)	(1)	448	448	mg/kg	Maximum Detected Concentration	(1)

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

### TABLE 3.6.RME **EXPOSURE POINT CONCENTRATION SUMMARY** REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of	Units	Arithmetic	95% UCL	Maximum Concentration					
	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale	
Cental Shipyard	Benzo(a)anthracene	mg/kg	0.21	0.30 (NP)	0.41	0.30	mg/kg	95% KM (t) UCL	ProUCL 4.1.01	
	Benzo(a)pyrene	mg/kg	0.11	0.17 (NP)	0.14	0.14	mg/kg	Maximum	(1)	
	Benzo(b)fluoranthene	mg/kg	0.23	0.34 (NP)	0.41	0.34	mg/kg	95% KM (t) UCL	ProUCL 4.1.01	
	Chrysene	mg/kg	0.21	0.30 (NP)	0.42	0.3	mg/kg	95% KM (t) UCL	ProUCL 4.1.01	
	Arsenic	mg/kg	16.2	23.7 (N)	24.4	23.7	mg/kg	95% Student's-t UCL	ProUCL 4.1.01	
	Chromium VI	mg/kg	14.50	17.3 (N)	18.2	17.3	mg/kg	95% Student's-t UCL	ProUCL 4.1.01	
	Cobalt	mg/kg	12.00	14.6 (N)	14.7	14.6	mg/kg	95% Student's-t UCL	ProUCL 4.1.01	
	Iron	mg/kg	28,000	32,800 (NP)	32,500	32,500	mg/kg	Maximum Detected Concentration	(1)	
	Manganese	mg/kg	381	435 (N)	448	435	mg/kg	95% Student's-t UCL	ProUCL 4.1.01	

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios. (1) Calculated 95% UCL exceeds the maximum concentration. Maximum concentration used as the EPC.

### TABLE 3.7.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Subsurface Soil

Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
Cental Shipyard	Benzo(a)anthracene	l mg/kg	0.294	0.278 (G)	1.30	0.278	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(a)pyrene	mg/kg	0.257	0.194 (G)	0.69	0.194	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(b)fluoranthene	mg/kg	0.282	0.247 (G)	0.91	0.247	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Chrysene	mg/kg	0.296	0.282 (L)	1.3	0.282	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.046	0.046	mg/kg	Maximum Detected Concentration	(1)
	Indeno(1,2,3-cd)pyrene	mg/kg	0.27	0.2	0.24	0.2	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Aluminum	mg/kg	9,450	10,200 (N)	14,300	10,200	mg/kg	95% Student's-t UCL.	ProUCL 4.1.01
	Arsenic	mg/kg	16.4	18.4 (N)	37.3	18.4	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	12.5	13.3 (N)	22	13.3	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
!	Cobalt	mg/kg	11.1	12.3 (N)	20.2	12.3	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Iron	mg/kg	24,600	26,900 (N)	40,100	26,900	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There was only one detected concentration. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

# TABLE 3.8.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future

Medium: Groundwater

Exposure Medium: Groundwater

Exposure Point	Chemical of	Units	Arithmetic	95% UCL	Maximum Concentration	Exposure Point Concentration				
	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale	
Central Shipyard	Aluminum	ug/L	(1)	(1)	312	312	ug/L	Maximum Detected Concentration	(1)	
	Arsenic	ug/L	(1)	(1)	78.1 J	78.1	ug/L	Maximum Detected Concentration	(1)	
	Cadmium	ug/L	(1)	(1)	1.53	1.53	ug/L	Maximum Detected Concentration	(1)	
	Cobalt	ug/L	(1)	(1)	24.8	24.8	ug/L	Maximum Detected Concentration	(1)	
	Iron	ug/L	(1)	(1)	65,800 J	65,800	ug/L	Maximum Detected Concentration	(1)	
	Manganese	ug/L	(1)	(1)	9,100	9,100	ug/L	Maximum Detected Concentration	(1)	

### Notes:

1 - Only two groundwater sample was collected at the Central Shipyard in 2011 therefore statistics could not be calculated. The maximum detected concentration is used as the exposure point concentration for groundwater.

### TABLE 3.9.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of	Units	Arithmetic	95% UCL	Maximum Concentration	Exposure Point Concentration					
	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale		
Unpaved	Benzo(a)anthracene	mg/kg	0.230	0.324 (N)	0.47	0.324	mg/kg	95% KM (t) UCL	ProUCL 4.1.01		
Former Building 234	Benzo(a)pyrene	mg/kg	0.214	0.288 (N)	0.41	0.288	mg/kg	95% KM (t) UCL	ProUCL 4.1.01		
Surface Soil	Benzo(b)fluoranthene	mg/kg	0.314	0.477 (N)	0.66	0.477	mg/kg	95% KM (t) UCL	ProUCL 4.1.01		
	Chrysene	mg/kg	0.274	0.409 (N)	0.58	0.409	mg/kg	95% KM (t) UCL	ProUCL 4.1.01		
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.062	0.062	mg/kg	Maximum Detected Concentration	(1)		
	indeno(1,2,3-cd)pyrene	mg/kg	0.26	0.180 (N)	0.19	0.18	mg/kg	95% KM (t) UCL	ProUCL 4.1.01		
	Arsenic	mg/kg	11.9	17.9 (N)	23.6	17.9	mg/kg	95% Student's-t UCL	ProUCL 4.1.01		
	Beryllium	mg/kg	0.84	3.2 (G)	3.5	3.2	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.1.01		
·	Cadmium	mg/kg	(1)	(1)	13	13	mg/kg	Maximum Detected Concentration	(1)		
	Chromium VI	mg/kg	34.00	83 (G)	130	83	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01		
	Cobalt	mg/kg	12.40	20.0 (N)	23.9	20	mg/kg	95% Student's-t UCL	ProUCL 4.1.01		
	Iron	mg/kg	22,700	32,100 (N)	37,200	32,100	mg/kg	95% Student's-t UCL	ProUCL 4.1.01		
	Lead	mg/kg	53.9	135 (G)	189	53.9	mg/kg	Arithmetic Mean Concentration	(2)		
	Manganese	mg/kg	366	509 (N)	597	509	mg/kg	95% Student's-t UCL	ProUCL 4.1.01		

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

<sup>1</sup> There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

 <sup>2 -</sup> Mean concentration is used as exposure point concentration for evaluating exposures to lead.
 U.S. EPA, 1994:Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

## TABLE 3.10.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of	Units	Arithmetic	95% UCL	Maximum Concentration						
	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale		
Former Building 234	Benzo(a)anthracene	mg/kg	0.22	0.30 (N)	0.47	0.3	mg/kg	95% KM (t) UCL	ProUCL 4.1.01		
	Benzo(a)pyrene	mg/kg	0.21	0.27 (N)	0.41	0.27	mg/kg	95% KM (t) UCL	ProUCL 4.1.01		
<u>J</u>	Benzo(b)fluoranthene	mg/kg	0.28	0.43 (N)	0.66	0.43	mg/kg	95% KM (t) UCL	ProUCL 4.1.01		
}	Chrysene	mg/kg_	0.25	0.36 (N)	0.58 J	0.36	mg/kg	95% KM (t) UCL	ProUCL 4.1.01		
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.062 J	0.062	mg/kg	Maximum Detected Concentration	(1)		
	Indeno(1,2,3-cd)pyrene	mg/kg	0.25	0.18 (N)	0.19 J	0.18	mg/kg	95% KM (t) UCL	ProUCL 4.1.01		
	Arsenic	mg/kg	11.2	16.4 (N)	23.6	16.4	mg/kg	95% Student's-t UCL	ProUCL 4.1.01		
	Beryllium	mg/kg_	0.75	3.7 (L)	3.5	3.5	mg/kg	Maximum Detected Concentration	(2)		
	Cadmium	mg/kg	(1)	(1)	13	13	mg/kg	Maximum Detected Concentration	(1)		
	Chromium VI	mg/kg	31.60	91.1 (L)	130	91.1	mg/kg	95% H-UCL	ProUCL 4.1.01		
1	Cobalt	mg/kg	11.80	17.8 (N)	23.9	17.8	mg/kg	95% Student's-t UCL	ProUCL 4.1.01		
	Iron	mg/kg	22,300	30,020 (N)	37,200	30,020	mg/kg	95% Student's-t UCL	ProUCL 4.1.01		
	Lead	mg/kg	53.6	115 (G)	189 J	53.6	mg/kg	Arithmetic Mean	(3)		
1	Manganese	mg/kg	356	474 (N)	597	474	mg/kg	95% Student's-t UCL	ProUCL 4.1.01		

G = Gamma

N = Normal

NP = Non-parametric

- 1 There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.
- 2 The calculated 95% UCL exceeds the maximum concentration. The maximum concentration was used as the EPC.
- 3 Mean concentration is used as exposure point concentration for evaluating exposures to lead.
  - U.S. EPA, 1994; Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

## TABLE 3.11.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Subsurface Soil

Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
Former Building 234	Benzo(a)pyrene	mg/kg	(1)	(1)	0.055 J	0.055	mg/kg	Maximum Detected Concentration	(1)
	Aluminum	mg/kg	9,990	12,600 (N)	23,300	12,600	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Arsenic	mg/kg	12.1	23.3 (G)	42	23.3	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	18.5	25.4 (G)	60.2	25.4	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01
	Cobalt	mg/kg	10.5	13.3 (N)	25	13.3	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
i	Iron	mg/kg	26,200	31,600 (N)	50,000	31,600	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Manganese	mg/kg	450	684 (G)	2,450	684	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

### TABLE 3.12.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future

Medium: Groundwater Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
Former Building 234	cis-1,2-Dichloroethene	ug/L	(1)	(1)	12.7	12.7	ug/L	Maximum Detected Concentration	(1)
Ĭ	Trichloroethene (Mutagenic)	ug/L	(1)	(1)	3.9	3.9	ug/L	Maximum Detected Concentration	(1)
	Trichloroethene (Nonmutagenic)	ug/L	(1)	(1)	3.9	3.9	ug/L	Maximum Detected Concentration	(1)
1	Vinyl Chloride	ug/L	(1)	(1)	0.263 J	0.263	ug/L	Maximum Detected Concentration	(1)
	Aluminum	ug/L	(1)	(1)	53.7	53.7	ug/L	Maximum Detected Concentration	(1)
	Arsenic	ug/L	(1)	(1)	1.32 J	1.32	ug/L	Maximum Detected Concentration	(1)
	Cobalt	ug/L	(1)	(1)	1.74 ป	1.74	ug/L	Maximum Detected Concentration	(2)
	Iron	ug/L	(1)	(1)	459	459	ug/L	Maximum Detected Concentration	(1)
i	Manganese	ug/L	(1)	(1)	532	532	ug/L	Maximum Detected Concentration	(1)

#### Notes:

<sup>1 -</sup> Only one groundwater sample was collected at Building 234 in 2011 therefore statistics could not be calculated. The maximum detected concentration is used as the exposure point concentration for groundwater.

## TABLE 3.13.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Subsurface Soil Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	on Exposure Point Concentration  Value Units Statistic R			
South Waterfront	Aluminum	mg/kg	12,000	15,800 (N)	17,400	15,800	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Arsenic	mg/kg	17.1	23.7 (N)	26.3	23.7	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	14.7	19.1 (N)	21.2	19.1	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Cobalt	mg/kg	16.5	23.8 (N)	29.9	23.8	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Iron	mg/kg	31,900	41,800 (N)	45,500	41,800	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

### N = Normal

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

# TABLE 3.14.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of	Units	Arithmetic	95% UCL	Maximum Concentration	Exposure Point Concentration					
	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale		
Unpaved	Benzo(a)anthracene	mg/kg	(1)	(1)	0.13	0.13	mg/kg	Maximum Detected Concentration	(1)		
PCB Removal Area	Benzo(a)pyrene	mg/kg	(1)	. (1)	0.12	0.12	mg/kg	Maximum Detected Concentration	(1)		
Surface Soil	Benzo(b)fluoranthene	mg/kg	(1)	(1)	0.18	0.18	mg/kg	Maximum Detected Concentration	(1)		
	Benzo(g,h,i)perylene	mg/kg	(1)	(1)	0.072	0.072	mg/kg	Maximum Detected Concentration	(1)		
	Benzo(k)fluoranthene	mg/kg	(1)	(1)	0.086	0.086	mg/kg	Maximum Detected Concentration	(1)		
	Chrysene	mg/kg	(1)	(1)	0.14	0.14	mg/kg	Maximum Detected Concentration	(1)		
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.0174	0.017	mg/kg	Maximum Detected Concentration	(1)		
	Indeno(1,2,3-cd)pyrene	mg/kg	(1)	(1)	0.071	0.071	mg/kg	Maximum Detected Concentration	(1)		
	Total Aroclors	mg/kg	(1)	(1)	0.0244	0.0244	mg/kg	Maximum Detected Concentration	(1)		
1	Arsenic	mg/kg	(1)	(1)	21.7	21.7	mg/kg	Maximum Detected Concentration	(1)		
	Cobalt	mg/kg	(1)	(1)	22.7	22.7	mg/kg	Maximum Detected Concentration	(1)		
	Iron	mg/kg	(1)	(1)	30,600	30,600	mg/kg	Maximum Detected Concentration	(1)		
	Manganese	mg/kg	(1)	(1)	619	619	mg/kg	Maximum Detected Concentration	(1)		

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

# TABLE 3.15.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of	Units	Arithmetic	95% UCL	Maximum Concentration				
	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale
PCB Removal Area	Benzo(a)anthracene	mg/kg	(1)	(1)	5.74	5.74	mg/kg	Maximum Detected Concentration	(1)
	Benzo(a)pyrene	mg/kg	(1)	(1)	4.92	4.92	mg/kg	Maximum Detected Concentration	(1)
	Benzo(b)fluoranthene	mg/kg	(1)	(1)	7.12	7.12	mg/kg	Maximum Detected Concentration	(1)
	Benzo(g,h,i)perylene	mg/kg	(1)	(1)	2.07	2.07	mg/kg	Maximum Detected Concentration	(1)
	Benzo(k)fluoranthene	mg/kg	(1)	(1)	2.48	2.48	mg/kg	Maximum Detected Concentration	(1)
	Chrysene	mg/kg	(1)	(1)	5.65	5.65	mg/kg_	Maximum Detected Concentration	(1)
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.82	0.82	mg/kg	Maximum Detected Concentration	(1)
	Indeno(1,2,3-cd)pyrene	mg/kg	(1)	(1)	2.07	2.07	mg/kg	Maximum Detected Concentration	(1)
	Total Aroclors	mg/kg	(2)	(2)	0.416	0.416	mg/kg	Maximum Detected Concentration	(2)
	Arsenic	mg/kg	(1)	(1)	21.8	21.8	mg/kg	Maximum Detected Concentration	(1)
	Cobalt	mg/kg	(1)	(1)	22.7	22.7	mg/kg	Maximum Detected Concentration	(1)
	Iron	mg/kg	(1)	(1)	32,000	32,000	mg/kg	Maximum Detected Concentration	(1)
l e	Manganese	mg/kg	(1)	(1)	619	619	mg/kg	Maximum Detected Concentration	(1)

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

- (1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.
- (2) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

I assumed the units were ug/kg and converted to mg/kg.

# TABLE 3.16.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Subsurface Soil Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
PCB Removal Area	Benzo(a)anthracene	mg/kg	0.099	0.146 (G)	0.252	0.146	mg/kg	95% KM (BCA) UCL	ProUCL 4.1.01
	Benzo(a)pyrene	mg/kg	0.079	0.167 (G)	0.172	0.167	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.1.01
	Benzo(b)fluoranthene	mg/kg	0.119	0.322 (G)	0.336	0.322	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.1.01
	Dibenzo(a,h)anthracene	mg/kg	0.041	0.044 (L)	0.0437	0.044	mg/kg	95% KM (BCA) UCL	ProUCL 4.1.01
	Aluminum	mg/kg	11,300	16,100 (N)	19,900	16,100	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
·	Arsenic	mg/kg	16.3	35.0 (G)	47.2	35	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	13.4	19.1 (N)	25.6	19.1	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Cobalt	mg/kg	12.4	18.7 (N)	24	18.7	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Iron	mg/kg	27,200	37,600 (N)	43,600	37,600	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Manganese	mg/kg	520	872 (G)	1,190	872	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

RAGS Part D Table 4

**Values Used For Daily Intake Calculations** 

# LIST OF TABLES RAGS PART D TABLE 4 VALUES USED FOR DAILY INTAKE CALCULATIONS

Table No.	
	Reasonable Maximum Exposures
4.1.RME	Adolescent Trespassers Exposed to Surface Soil/Subsurface Soil
4.2.RME	Adolescent Trespassers Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.3.RME	Adult Trespassers Exposed to Surface Soil/Subsurface Soil
4.4.RME	Adult Trespassers Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.5.RME	Construction Workers Exposed to Surface Soil/Subsurface Soil
4.6.RME	Construction Workers Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.7.RME	Construction Workers Exposed to Groundwater
4.8.RME	Construction Workers Exposed to Volatile Emissions from Groundwater
4.9.RME	Industrial Workers Exposed to Surface Soil/Subsurface Soil
4.10.RME	Industrial Workers Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.11.RME	Industrial Workers Exposed to Groundwater
4.12.RME	Child Residents Exposed to Surface Soil/Subsurface Soil
4.13.RME	Child Residents Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.14.RME	Child Residents Exposed to Groundwater
4.15.RME	Child Residents Exposed to Volatile Emissions from Groundwater
4.16.RME	Adult Residents Exposed to Surface Soil/Subsurface Soil
4.17.RME	Adult Residents Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.18.RME	Adult Residents Exposed to Groundwater
4.19.RME	Adult Residents Exposed to Volatile Emissions from Groundwater

#### TABLE 4.1.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

## REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SOILS FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Surface Soil/Subsurface Soil Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adolescent	Derecktor Shipyard	cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
ļ				IR-S	Ingestion Rate	100	mg/day	USEPA, 1997	j
1	!			CF3	Conversion Factor 3	0.000001	kg/mg		CS x IRS x CF3 x FI x EF x ED
	i			FI	Fraction Ingested	1	unitless	USEPA, 1997	BW x AT
jj				EF	Exposure Frequency	48	days/year	(1)	
				ED	Exposure Duration	10	years	(2)	i
				BW	Body Weight	50	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	1
				AT-N	Averaging Time (Non-Cancer)	3650	days	USEPA, 1989	
Dermal	Trespassers	Adolescent	Derecktor Shipyard	cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	0.000001	kg/mg		
				SA	Skin Surface Available for Contact	5050	cm2	(3)	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
•	ļ			SSAF	Soil to Skin Adherence Factor	0.4	mg/cm2/event	USEPA, 2004	BW x AT
1.				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	1
<b>1</b>				EV	Events Frequency	1	events/day	USEPA, 2004	1
ł				EF	Exposure Frequency	48	days/year	(1)	
				ED	Exposure Duration	10	years	(2)	
1				BW	Body Weight	50	kg	USEPA, 1997	
	•			AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3650	days	USEPA, 1989	

#### Notes:

- 1 Assumes two days a week for 24 weeks (mid-April through mid-October.
- 2 Adolescent ages 6 to 16 years old and an adult ages 16 to 36 years old for a total exposure duration of 30 years.
- 3 Assumes assumes that the head, forearms, hands, lower legs, and feet are exposed (USEPA, 1997).

#### Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

#### Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 3.76E-08

Cancer Dermal Intake = 7.59E-07

Noncancer Ingestion Intake = 2.63E-07

Noncancer Dermal Intake = 5.31E-06

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

#### TABLE 4.2.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

# REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SOILS TO AIR FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Surface/Subsurface Soil Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Trespassers	Adolescent	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m³) =
				cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
	1			ET	Exposure Time	4	hours/day	(1)	<u>CA x ET x EF x ED</u>
				EF	Exposure Frequency	48	days/year	(1)	AT x 24 hours/day
				ED	Exposure Duration	10	years	(2)	
	i			AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
ł i				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.10E+10	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	j
				Q/C	Inverse of mean concentration at	73.95045	g/m2-s per	USEPA, 2012	}
					center of source		kg/m3		}
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2012	1
			li	Um	Mean annual wind speed	3.84	m/sec	USEPA, 2012	
İ				v	Fraction of vegetative cover	0.5	unitless	USEPA, 2012	
				F(x)	Function dependent of Um/Ut	0.0345	unitless	USEPA, 2012	

#### Notes:

- 1 Assumes 4 hours a day, two days a week for 24 weeks (mid-April through mid-October.
- 2 Adolescent ages 6 to 16 years old and an adult ages 16 to 36 years old for a total exposure duration of 30 years.

### Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.lsd.oml.gov/calc\_start.htm. Site-specific values for Hartford, Connecticut.

#### Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 3.13E-03

Noncancer Inhalation Intake = 2.19E-02

#### TABLE 4.3.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

## REASONABLE MAXIMUM EXPOSURE - ADULT RECREATIONAL USERS - SOILS FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Surface Soil/Subsurface Soil Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adult	Derecktor Shipyard	cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1991	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	**	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1997	BW x AT
				EF	Exposure Frequency	48	days/year	(1)	
				ED2	Exposure Duration (Age 16 - 30)	20	years	(2)	
				BW	Body Weight	70	kg	USEPA, 1989	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 1989	
Dermal	Trespassers	Adult	Derecktor Shipyard	cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg		
				SA	Skin Surface Available for Contact	5,700	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	1
	i l			EV	Events Frequency	1	events/day	USEPA, 2004	'
				EF	Exposure Frequency	48	days/year	(1)	
				ED2	Exposure Duration (Age 16 - 30)	20	years	(2)	
				BW	Body Weight	70	kg	USEPA, 1989	· ·
Į.				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 1989	

#### Notes:

- 1 Assumes two days a week for 24 weeks (mid-April through mid-October.
- 2 Adolescent ages 6 to 16 years old and an adult ages 16 to 36 years old for a total exposure duration of 30 years.

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1991: Risk Assessment Guidance for Superfund - Supplemental Guidance- Standard Default Exposure Factors Interim Final.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

#### Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 30) = 5.37E-08 Cancer Dermal Intake (Age 6 - 30) = 2.14E-07

Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 16) = 0.00E+00 Cancer Dermal Intake (Age 6 - 16) = 0.00E+00

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 1.88E-07

Noncancer Dermal Intake ⇒ 7.50E-07

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

#### TABLE 4.4.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

#### REASONABLE MAXIMUM EXPOSURE - ADULT RECREATIONAL USERS - SOILS TO AIR FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Surface/Subsurface Soil Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Trespassers	Adult	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m³) =
l				cs	Chernical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	4	hours/day	(1)	<u>CA x ET x EF x ED</u>
1			•	EF	Exposure Frequency	48	days/year	(1)	AT x 24 hours/day
				ED2	Exposure Duration (Age 16 - 30)	20	years	(2)	'
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 1989	•
				PEF	Particulate Emission Factor	1.10E+10	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at	73.95045	g/m2-s per	USEPA, 2012	
					center of source		kg/m3		
			,	Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2012	
				Um	Mean annual wind speed	3.84	m/sec	USEPA, 2012	1
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2012	
				F(x)	Function dependent of Um/Ut	0.0345	unitless	USEPA, 2012	

#### Notes:

- 1 Assumes 4 hours a day, two days a week for 24 weeks (mid-April through mid-October.
- 2 Adolescent ages 6 to 16 years old and an adult ages 16 to 36 years old for a total exposure duration of 30 years.

#### Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.lsd.orml.gov/calc\_start.htm. Site-specific values for Hartford, Connecticut.

#### Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Non-Mutagenic Chemicals

Noncarcinogenic Chemicals

Cancer Inhalation Intake (Age 6 - 30) = 6.26E-03

Noncancer Inhalation Intake = 2.19E-02

Mutagenic Chemicals

Cancer Inhalation Intake (Age 6 - 16) = 0.00E+00

Cancer Inhalation Intake (Age 16 - 30) = 6.26E-03

#### TABLE 4.5.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

# REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS- SOILS FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future

Medium: Surface Soil/Subsurface Soil

Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	intake Equation/ Model Name
Ingestion	Construction Workers	Adult	Derecktor Shipyard	cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	330	mg/day	USEPA, 2002b	
				CF3	Conversion Factor 3	0.000001	kg/mg		CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 2002b	BW x AT
				EF	Exposure Frequency	130	days/year	(1)	
				ED	Exposure Duration	1	years	USEPA, 2002b	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
Dermal	Construction Workers	Adult	Derecktor Shipyard	cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	0.000001	kg/mg		
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.3	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	130	days/year	(1)	
				ED	Exposure Duration	1	years	USEPA, 2002b	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

#### Notes:

1 - Professional judgment. Assumes 5 days a week over six months.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

#### Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 2.40E-08

Cancer Dermal Intake = 7.20E-08

Noncancer Ingestion Intake = 1.68E-06

Noncancer Dermal Intake = 5.04E-06

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

#### TABLE 4.6.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

# REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS - SOILS TO AIR FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Surface/Subsurface Soil Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Workers	Adult	Derecktor Shipyard	1	Chemical concentration in air Chemical concentration in soil	Calculated Max or 95% UCL	mg/m3 mg/kg	USEPA, 2002a USEPA, 2002b	Exposure Concentration (mg/m³) =
				ET	Exposure Time	8	hours/day	(1)	<u>CA x ET x EF x ED</u>
				EF	Exposure Frequency	130	days/year	(1)	AT x 24 hours/day
1				ED	Exposure Duration	1	years	USEPA, 2002b	i
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
	i		Ì	AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	i i
				PEF	Particulate Emission Factor	1.40E+06	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	

#### Notes:

1 - Professional judgment. Assumes 5 days a week over six months.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

#### Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer inhalation Intake = 1.70E-03

Noncancer Inhalation Intake = 1.19E-01

#### TABLE 4.7.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

# REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS - GROUNDWATER FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future

Medium: Groundwater

Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Workers	Adult	Derecktor Shipyard	CGW	Chemical Concentration in Groundwater	Maximum	ug/L	USEPA Region I, 1999	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug		
				IR-GW	Ingestion Rate of Groundwater	0.05	L/day	(1)	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	130	days/year	(1)	BW x AT
				ED	Exposure Duration	1	years	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
Dermal	Construction Workers	Adult	Derecktor Shipyard	Daevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
1				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2002	
• 1				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
•				CF	Conversion factor	0.001	L/cm <sup>3</sup>		BW x AT
	į į	,		Кр	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
	,	'		tevent	Duration of event	8	hr/event	(1)	
	•			В	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/pi]
				EV	Event Frequency	1	events/day	(1)	
				EF	Exposure Frequency	130	days/year	(1)	For organics if tevent > t*
				ED	Exposure Duration	1	years	USEPA, 2002	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				BW	Body Weight	70	kg	USEPA, 1997	$2 \times \tau + (1 + 3B + 3B^2)/(1+B^2)$
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

#### Notes:

1 - Professional judgment. Assumes 5 days a week over six months.

#### Sources

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA Region I, 1999. Risk Updates, Number 5.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

#### Unit Intake Calculations

Dermal Intake = (SA x EV x EF x ED)/(BW x AT)

Cancer Dermal Intake = 2.40E-01

Noncancer Dermal Intake = 1.68E+01

Cancer risk from dermal contact = Groundwater concentration x Cancer Dermal Intake x DAevent x Dermal Cancer Slope Factor
Hazard Index from dermal contact = Groundwater concentration x Noncancer Dermal Intake x DAevent / Dermal Reference Dose

#### TABLE 4.8.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

# REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS - GROUNDWATER TO AIR FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future

Medium: Groundwater Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Workers	Adult	Derecktor Shipyard		Chemical concentration in air	Calculated	mg/m3	VDEQ, 2004	Exposure Concentration (mg/m³) =
į.				CW	Chemical concentration in water.	Average	ug/L		
				CF	Conversion Factor	0.001	mg/ug		<u>CAXETXEFXED</u>
1				ET	Exposure Time	8	hours/day	(1)	AT x 24 hours/day
				EF	Exposure Frequency	130	days/year	(1)	
				ED	Exposure Duration	1	years	USEPA, 2002	CA = CW x CF x VF
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	i
H				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
				VF	Volatilization Factor	Calculated	(mg/m3)/(mg/L)	VDEQ, 2012	

#### Notes:

1 - Professional judgment. Assumes 5 days a week over six months.

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

VDEQ, 2012: Virginia Department of Environmental Quality (VDEQ, online- http://www.deq.state.va.us/vrprisk/homepage.html).

#### **Unit Intake Calculations**

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 1.70E-06

Noncancer Inhalation Intake = 1.19E-04

#### TABLE 4.9.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

#### REASONABLE MAXIMUM EXPOSURE - INDUSTRIAL WORKERS - SOIL

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Surface Soil/Subsurface Soil Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Industrial Workers	Adult	Derecktor Shipyard	cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
ľ				IR-S	Ingestion Rate	100	mg/day	USEPA, 1997	
				CF3	Conversion Factor 3	0.000001	kg/mg		CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 2004	BW x AT
				EF	Exposure Frequency	250	days/year	USEPA, 2004; RIDEM, 2011	
				ED	Exposure Duration	25	years	USEPA, 1997; RIDEM, 2011	
1				BW	Body Weight	70	kg	USEPA, 1997; RIDEM, 2011	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989; RIDEM, 2011	Í
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989; RIDEM, 2011	
Dermal	Industrial Workers	Adult	Derecktor Shipyard	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
}				CF3	Conversion Factor 3	0.000001	kg/mg		
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				ΕV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	250	days/year	USEPA, 2004	
1				ED	Exposure Duration	25	years	USEPA, 1997	
1				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989	

#### Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

RIDEM, 2011: Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

### Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 3.49E-07

Cancer Dermal Intake = 2.31E-06

Noncancer Ingestion Intake = 9.78E-07

Noncancer Dermal Intake = 6.46E-06

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

#### ,TABLE 4.10.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

# REASONABLE MAXIMUM EXPOSURE - INDUSTRIAL WORKERS - SOIL TO AIR FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Medium: Surface/Subsurface Soil Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Workers	Adult	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m³) =
1				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	8	hours/day	(1)	<u>CA x ET x EF x ED</u>
				EF	Exposure Frequency	250	days/year	USEPA, 1997	AT x 24 hours/day
	İ			ED	Exposure Duration	25	years		
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.10E+10	m3/kg	USEPA, 2002a	· .
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at	73.95045	g/m2-s per	USEPA, 2012	
					center of source		kg/m3		
	!	,		Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2012	
				Um	Mean annual wind speed	3.84	m/sec	USEPA, 2012	
Į.				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2012	
				F(x)	Function dependent of Um/Ut	0.0345	unitless	USEPA, 2012	

#### Notes:

1 - Length of typical work day.

#### Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.lsd.ornl.gov/calc\_start.htm. Site-specific values for Hartford, Connecticut.

#### Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 8.15E-02

Noncancer Inhalation Intake = 2.28E-01

#### TABLE 4.11.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

## REASONABLE MAXIMUM EXPOSURE - INDUSTRIAL WORKERS - GROUNDWATER FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Groundwater Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Industrial Workers	Adult	Derecktor Shipyard	cgw	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug		
	}			IR-GW	Ingestion Rate of Groundwater	1 1	L/day	USEPA, 1991	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	250	days/year	USEPA, 2004	BW x AT
	1			ED	Exposure Duration	25	years	USEPA, 1997; RIDEM, 2011	
				BW	Body Weight	70	kg	USEPA, 1997; RIDEM, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989; RIDEM, 2011	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1989; RIDEM, 2011	
Dermal	Industrial Workers	Adult	Derecktor Shipyard	Daevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2002	DAevent x EV x EF x ED x SA
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	BW x AT
				CF	Conversion factor	0.001	L/cm3		i
				Кp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	For inorganics
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	
				tevent	Duration of event	0.5	hr/event ,	(1)	For organics if tevent <= t*
				В	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x \tau x tevent)/pi]
				SA	Skin Surface Available for Contact	904	cm2	(2)	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	250	days/year	USEPA, 2004	For organics if tevent > t*
				ED	Exposure Duration	25	years	USEPA, 1997; RIDEM, 2011	DAevent =FA x Kp x Cw x CF x (tevent/(1+B) +
	}			BW	Body Weight	70	kg	USEPA, 1997; RIDEM, 2011	2 x t +(1 + 3B + 3B <sup>2</sup> )/(1+B <sup>2</sup> )
	1			AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989; RIDEM, 2011	
		l	l	AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1989; RIDEM, 2011	

#### Notes

1 - Professional judgment.

2 - Represents hands of the industrial worker, USEPA, 2004.

Sources

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1991: Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. OSWER Directive 9285.6-03.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

RIDEM, 2011: Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

#### Unit Intake Calculations

Ingestion Intake = (IR-GW x EF x ED)/(BW x AT)

Dermal Intake = (SA x EV x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Mutagenic Chemicals

Cancer Ingestion Intake ure Duration = 3.49E-06 Cancer Dermal Intake ure Duration = 3.16E+00

Cancer Ingestion Intake = 0.00E+00

Cancer Dermal Intake = 0.00E+00

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 9.78E-06

Noncancer Dermal Intake = 8.85E+00

Cancer risk from ingestion = Groundwater concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor
Cancer risk from dermal contact = Groundwater concentration x Cancer Dermal Intake x D Aevent x Dermal Cancer Slope Factor
Hazard Index from ingestion = Groundwater concentration x Noncancer Ingestion Intake / Oral Reference Dose
Hazard Index from dermal contact = Groundwater concentration x Noncancer Dermal Intake x D Aevent / Dermal Reference Dose

#### TABLE 4.12.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

### REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS - SOILS

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Surface Soil/Subsurface Soil Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Child	Derecktor Shipyard	cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) ≈
ŀ				IR-S	Ingestion Rate	200	mg/day	USEPA, 1997;RIDEM, 2011	(
			ŀ	CF3	Conversion Factor 3	1.0E-06	kg/mg	~	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	-	BW x AT
				EF	Exposure Frequency	350	days/year	USEPA, 2004;RIDEM, 2011	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	15	kg	USEPA, 1997;RIDEM, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989;RIDEM, 2011	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	
Dermal	Resident	Child	Derecktor Shipyard	cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
			1	CF3	Conversion Factor 3	1E-06	kg/mg	-	
			1	SA	Skin Surface Available for Contact	2,800	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				ΕV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
	1			ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	
1				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1989, 2005	
ľ	1			вw	Body Weight	15	kg	USEPA, 1997	
ľ	1			AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
	1			AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	

#### Notes:

1 - Children were evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children were evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

#### Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund, Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Parl E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

RIDEM, 2011: Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

#### Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x F) x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

#### Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 0 - 6) = 1.10E-06 Cancer Dermal Intake (Age 0 - 6) = 3.07E-06

### Mutagenic Chemicals

Cancer Ingestion Intake (Age 0 - 2) = 3.65E-07 Cancer Dermal Intake (Age 0 - 2) = 1.02E-06

Cancer Ingestion Intake (Age 2 - 6) = 7.31E-07 Cancer Dermal Intake (Age 2 - 6) = 2.05E-06

#### Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 1.28E-05

Noncancer Dermal Intake = 3.58E-05

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact ≈ Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

#### TABLE 4.13.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

# REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS SOILS TO AIR FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Surface/Subsurface Soll Exposure Medium: Air

Exposure Roule	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation∕ Model Name
Inhalation	Resident	Child	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m³) =
				cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2002a	<u>CA x ET x EF x ED</u>
				EF	Exposure Frequency	350	days/year	USEPA, 2002a;RIDEM, 2011	AT x 24 hours/day
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1989, 2005	CA = (1/PEF + 1/VF) x Cs
		1		AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2190	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.10E+10	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at	73.95045	g/m2-s per	USEPA, 2012	
					center of source		kg/m3		
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2012	
1				Um	Mean annual wind speed	3.84	m/sec	USEPA, 2012	}
1				٧	Fraction of vegetative cover	0.5	unitless	USEPA, 2012	
				F(x)	Function dependent of Um/Ut	0.0345	unitless	USEPA, 2012	

#### Notes:

1 - Children were evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children were evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

#### Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.lsd.ornl.gov/calc\_start.htm. Site-specific values for Philadelphia, Pennsylvania.

RIDEM, 2011: Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

#### Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Non-Mutagenic Chemicals

Noncarcinogenic Chemicals

Cancer Inhalation Intake (Age 0 - 6) = 8.22E-02

Noncancer Inhalation Intake = 1.92E+00

Mutagenic Chemicals

Cancer Inhalation Intake (Age 0 - 2) = 2.74E-02

Cancer Inhalation Intake (Age 2 - 6) = 5.48E-02

#### TABLE 4.14.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

## REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS - GROUNDWATER FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Groundwater Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Child	Derecktor Shipyard	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	-	
				IR-GW	Ingestion Rate of Groundwater	1	L/day	USEPA, 1997	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	350	days/year	USEPA, 2004	BW x AT
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	15	kg	USEPA, 1987	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	
Dermal	Residents	Child	Derecktor Shipyard		Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2002	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm3		BW x AT
				Кp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	t	hr/event	USEPA, 2004	
				В	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	6,600	cm2	USEPA, 2004	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/pi]
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 2 - 6)	4 .	years	(1), USEPA, 1989, 2005	$2 \times \tau + (1 + 3B + 3B^2)/(1+B^2)$
				BW	Body Weight	15	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
	1			1	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	

#### Notes

1 - Children were evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children were evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

#### Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund, Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa

USEPA, 2002:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/P/99/005.

#### Unit Intake Calculations

Ingestion Intake = (IR-GW x EF x ED)/(BW x AT)

Dermai Intake = (SA x EV x EF x ED)/(BW x AT)

#### Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 0 - 6) = 5.48E-06 Cancer Dermal Intake Time (Age 0 - 6) = 3.62E+01

Mutagenic Chemicals

Cancer Ingestion Intake (Age 0 - 2) = 1.83E-06 Cancer Dermal Intake (Age 0 - 2) = 1.21E+01

Cancer Ingestion Intake (Age 2 - 6) = 3.65E-06 Cancer Dermal Intake (Age 2 - 6) = 2.41E+01

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 6.39E-05 Noncancer Dermal Intake = 4.22E+02

Cancer risk from ingestion = Groundwater concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor
Cancer risk from dermal contact = Groundwater concentration x Cancer Dermal Intake x DAevent x Dermal Cancer Siope Factor
Hazard Index from ingestion = Groundwater concentration x Noncancer Ingestion Intake / Oral Reference Dose
Hazard Index from dermal contact = Groundwater concentration x Noncancer Dermal Intake x DAevent / Dermal Reference Dose

#### TABLE 4.15.RME

### VALUES USED FOR DAILY INTAKE CALCULATIONS

# REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS - INHALATION OF VOLATILES FROM GROUNDWATER FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future

Medium: Groundwater Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Residents	Child	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 1991	Exposure Concentration (mg/m³) =
•				GW	Chemical concentration in water.	95% UCL or Max	ug/L	USEPA, 2002	
				CF	Conversion Factor	0.001	mg/ug		<u>CA x ET x EF x ED</u>
				EΤ	Exposure Time	24	hours/day	USEPA, 1991	AT x 24 hours/day
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
		,		ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	CA = CW x CF x VF
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1989, 2005	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1997	
				AT-N	Averaging Time (Non-Cancer)	2190	days	USEPA, 1989	
				VF	Volatilization Factor	0.5	L/m3	USEPA, 1989	

#### Notes:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1991: Human Health Evaluation Manual, Part B: Development of Risk-based Preliminary Remediation Goals. OSWER Directive 9285.7-01B.

USEPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

#### Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 2.74E-05

Noncancer Inhalation Intake = 3.20E-04

<sup>1 -</sup> Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

#### TABLE 4.16.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

#### REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - SOILS

#### FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Surface Soll/Subsurface Soil Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Adult	Derecktor Shipyard	cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1997; RIDEM, 2011	
				CF3	Conversion Factor 3	1.0E-06	kg/mg		CS x IRS x CF3 x F1 x EF x ED
				FI	Fraction Ingested	1	unitless		BW x AT
			•	EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	70	kg	USEPA, 1997; RIDEM, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989; RIDEM, 2011	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	
Dermal	Resident	Adult	Derecktor Shipyard	cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	-	
				SA	Skin Surface Available for Contact	5,700	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm2/event	USEPA, 2004	BW x AT
		1		DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USÉPA, 1989	<u> </u>

#### Notes:

1 - Adults were evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults were evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

#### Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1997: Exposure Factors Handbook, EPA/600/8-95/002FA.

USEPA, 2002a:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2002b; Supplemental Guidance for Developing Soll Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E; Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

RIDEM, 2011; Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

#### Unit Intake Calculations

Incidental Ingestion Intake = (IA-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 30) = 4.70E-07 Cancer Dermal Intake (Age 6 - 30) = 1.87E-06

Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 16) = 1.96E-07 Cancer Dermai Intake (Age 6 - 16) = 7.81E-07

Cancer Ingestion Intake (Age 16 - 30) = 2.74E-07 Cancer Dermal Intake (Age 16 - 30) = 1.09E-06

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 1.37E-06

Noncancer Dermal Intake = 5.47E-06

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cencer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermat contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

#### TABLE 4.17.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

### REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - SOILS TO AIR FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Surface/Subsurface Soil Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m³) =
				cs	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
1				ET	Exposure Time	24	hours/day	USEPA, 2002a	<u>CA x ET x EF x ED</u>
				EF	Exposure Frequency	350	days/year	USEPA, 2002a; RIDEM, 2011	AT x 24 hours/day
1				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	CA = (1/PEF + 1/VF) x Cs
1				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8760	days	USEPA, 1989	Q / C × 3600
1				PEF	Particulate Emission Factor	1.10E+10	m3/kg	USEPA, 2002a	PEF = $\frac{1}{0.036 \times (1 - V) \times (U_m / U_t)^3 \times F(x)}$
1				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	$0.036 \times (1-V) \times (0_{\rm m} / 0_{\rm t}) \times F(X)$
i .				Q/C	Inverse of mean concentration at	73.95045	g/m2-s per	USEPA, 2012	
}					center of source		kg/m3		$F(x) = 0.18 * (8x^3 + 12x) * exp(-x^2)$
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2012	
1				Um	Mean annual wind speed	3.84	m/sec	USEPA, 2012	x = 0.886 * Ut / Um
				l v	Fraction of vegetative cover	0.5	unitless	USEPA, 2012	
				F(x)	Function dependent of Um/Ut	0.0345	unitless	USEPA, 2012	

1 - Adults were evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults were evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

#### Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.lsd.ornl.gov/calc\_start.htm. Site-specific values for Hartford, Connecticut.

RIDEM, 2011: Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

#### Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Non-Mutagenic Chemicals

Noncarcinogenic Chemicals

Cancer Inhalation Intake (Age 6 - 30) = 3.29E-01

Noncancer Inhalation Intake = 9.59E-01

Mutagenic Chemicals

Cancer Inhalation Intake (Age 6 - 16) = 1.37E-01

Cancer Inhalation Intake (Age 16 - 30) = 1.92E-01

#### TABLE 4.18.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

## ${\tt REASONABLE\,MAXIMUM\,EXPOSURE\cdot ADULT\,RESIDENTS\cdot GROUNDWATER}$

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Groundwater Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
ingestion	Residents	Adult	Derecktor Shipyard	CGW	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
	i			CF	Conversion Factor	0.001	mg/ug	**	
	1			IR-GW	Ingestion Rate of Groundwater	2	L/day	USEPA, 1997	CGW x CF x IR-GW x EF x ED
	i i			EF	Exposure Frequency	350	days/year	USEPA, 2004	BW x AT
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	
Dermal	Residents	Adult	Derecktor Shipyard	Daevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2002	DAevent x EV x EF x ED x SA
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	BW x AT
				CF	Conversion factor	0.001	L/cm3		
				Кр	Permeability coefficient	Chemical Specific	cm/hr		For inorganics
				τ	Lag time	Chemical Specific	hr/event		DAevent ≃ Kp x CW x CF x tevent
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	
				tevent	Duration of event	0.58	hr/event		For organics if tevent <= t*
				В	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x r x tevent)/pi]
				SA	Skin Surface Available for Contact	18,000	cm2	USEPA, 2004	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	For organics if levent > t*
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	2 x τ +(1 + 3B + 3B <sup>2</sup> )/(1+B <sup>2</sup> )
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
	1		l	AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	

## Notes:

1 - Adults were evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults were evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

#### Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

#### Unit Intake Calculations

Ingestion Intake = (IR-GW x EF x ED)/(BW x AT)

Dermal Intake = (SA x EV x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 30) = 9.39E-06 Cancer Dermal Intake (Age 6 - 30) = 8.45E+01

Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 16) = 3.91E-06 Cancer Dermal Intake (Age 6 - 16) = 3.52E+01

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 2.74E-05 Noncancer Dermal Intake = 2.47E+02

Cancer risk from ingestion = Groundwater concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact ≈ Groundwater concentration x Cancer Dermal Intake x DAevent x Dermal Cancer Slope Factor

Hazard Index from ingestion = Groundwater concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Groundwater concentration x Noncancer Dermal Intake x DAevent / Dermal Reference Dose

#### TABLE 4.19.RME

#### VALUES USED FOR DAILY INTAKE CALCULATIONS

# REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - INHALATION OF VOLATILES FROM GROUNDWATER FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future

Medium: Groundwater Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Residents	Adult	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 1991	Exposure Concentration (mg/m³) =
				GW	Chemical concentration in water.	95% UCL or Max	ug/L	USEPA, 2002	'
				CF	Conversion Factor	0.001	mg/ug		<u>CA x ET x EF x ED</u>
				ET	Exposure Time	24	hours/day	USEPA, 1991	AT x 24 hours/day
	}			EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	CA = CW x CF x VF
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	
		,		AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1997	
				AT-N	Averaging Time (Non-Cancer)	8496	days	USEPA, 1989	
				VF	Volatilization Factor	0.5	L/m3	USEPA, 1989	

#### Notes:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1991: Human Health Evaluation Manual, Part B: Development of Risk-based Preliminary Remediation Goals. OSWER Directive 9285.7-01B.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

#### Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 1.37E-04

Noncancer Inhalation Intake = 4.12E-04

<sup>1 -</sup> Adults will be evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults will be evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

**RAGS Part D Table 5** 

**Non-Cancer Toxicity Data** 

# LIST OF TABLES RAGS PART D TABLE 5 NON-CANCER TOXICITY DATA

## Table No.

5-1 Non-Cancer Toxicity Data - Oral/Dermal 5-2 Non-Cancer Toxicity Data - Inhalation

# TABLE 5.1 NON-CANCER TOXICITY DATA -- ORAL/DERMAL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

## PAGE 1 OF 2

Chemical of Potential	Chronic/ Subchronic	Ora	RfD	Oral Absorption Efficiency	Absorbed Rf	D for Dermal <sup>(2)</sup>	Primary Target	Combined Uncertainty/Modifying	RfD:Target Organ(s)	
Concern		Value	Units	for Dermal <sup>(1)</sup>	Value	Units	Organ(s)	Factors	Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds										
cis-1,2-Dichloroethene	Subchronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Kidney	300/1	PPATV	2/3/2011
CIS-1,2-Bichloroethene	Chronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	Kidney	3000/1	IRIS	9/21/2012
Tetrachloroethene	Subchronic	1.0E-01	mg/kg/day	1 1	1.0E-01	mg/kg/day	Liver	100/1	HEAST	9/97
	Chronic	6.0E-03	mg/kg/day	1 1	6.0E-03	mg/kg/day	Neurotoxicity	1000/1	IRIS	9/21/2012
Trichloroethene	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Immune System, Developmental	10 - 1000	IRIS	9/21/2012
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Liver	30/1	IRIS	9/21/2012
Semivolatile Organic Compou	ınds									
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA NA	NA	NA	NA NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA NA	NA	NA	NA
Benzo(g,h,i)perylene(3)	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Kidney	3000/1	IRIS	9/21/2012
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA NA	. NA	NA	NA
Chrysene	NA	NA	NA NA	NA	NA NA	NA	NA NA	NA NA	NA	NA NA
Dibenzo(a.h)anthracene	NA	NA	NA	NA .	NA	NA	NA NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA NA	NA	NA	NA
PCBs	•			•		•				
Total Aroclors	NA	NA	NA	NA NA	NA	NA NA	NA NA	NA	NA	NA
Inorganics				•						
Aluminum	Subchronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Central Nervous System	30/1	ATSDR	9/2008
Adminum	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Central Nervous System	100	PPRTV	10/23/2006
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, Cardiovascular System	3/1	IRIS	9/21/2012
Dan History	Subchronic	5.0E-03	mg/kg/day	0.007	3.5E-05	mg/kg/day	Gastrointestinal System	100/1	HEAST	9/97
Beryllium	Chronic	2.0E-03	mg/kg/day	0.007	1.4E-05	mg/kg/day	Gastrointestinal System	300/1	IRIS	9/21/2012
Cadmium	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Kidney	10/1	IRIS	9/21/2012
Chromium <sup>(4)</sup>	Subchronic	2.0E-02	mg/kg/day	0.025	5.0E-04	mg/kg/day	None Reported	100/3	HEAST	9/97
	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	None Reported	300/3	IRIS	6/3/2011
Cobalt	Subchronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Thyroid	300/1	PPRTV	8/25/2008
- Coban	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Thyroid	3000/1	PPRTV	8/25/2008
Iron	Subchronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
Lead	NA	NA	NA	NA	NA	NA	NA	NA .	NA	NA
Manganese <sup>(5)</sup>	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	Central Nervous System	1	IRIS	6/3/2011

# TABLE 5.1 NON-CANCER TOXICITY DATA -- ORAL/DERMAL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

#### Notes:

 U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.

- 2 Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
- 3 Pyrene is used as a surrogate for benzo(g,h,i)perylene.
- 4 Values are for hexavalent chromium.
- 5 Adjusted IRIS value in accordance with IRIS.

Definitions:

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

NA = Not Available.

ATSDR = Agency for Toxic Substances and Disease Registry.

PPRTV = Provisional Peer Reviewed Toxicity Value.

# TABLE 5.2 NON-CANCER TOXICITY DATA -- INHALATION FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

## PAGE 1 OF 2

Chemical of Potential	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD <sup>(1)</sup>		Primary Target	Combined Uncertainty/Modifying	RfC : Target Organ(s)	
Concern		Value	Units	Value	Units	Organ(s)	Factors	Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds									
cis-1,2-Dichloroethene	NA	NA .	NA NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	Chronic	4.0E-02	mg/m <sup>3</sup>	1.1E-02	(mg/kg/day)	Neurotoxicity	1000/1	IRIS	9/21/2012
Trichleseethana	Subchronic	5.4E-01	mg/m <sup>3</sup>	1.5E-01	(mg/kg/day)	Central Nervous System	300/1	ATSDR	9/1997
Trichloroethene	Chronic	2.0E-03	mg/m <sup>3</sup>	5.7E-04	(mg/kg/day)	Immune System, Developmental	10 - 100	IRIS	9/21/2012
Vinyl Chloride	Chronic	1.0E-01	mg/m³	2.9E-02	(mg/kg/day)	Liver	30/1	IRIS	9/21/2012
Semivolatile Organic Compounds									
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA NA	NA NA		NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA_	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	. NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA NA
PCBs									
Total Aroclors	NA	NA	NA	NA	NA	NA	NA NA	NA	NA
Inorganics									
Aluminum	Chronic	5.0E-03	mg/m3	1.4E-03	(mg/kg/day)	Central Nervous System	300/1	PPRTV	10/23/2006
Arsenic	Chronic	1.5E-05	mg/m3	4.3E-06	(mg/kg/day)	Skin, Cardiovascular System	NA	Cal EPA(1)	9/2009
Beryllium	Chronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Respiratory	10/1	IRIS	9/21/2012
Cadmium	Chronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Kidney, Respiratory	NA	Cal EPA(2)	12/2008
Chromium <sup>(2)</sup>	Chronic	1.0E-04	mg/m3	2.9E-05	(mg/kg/day)	Respiratory	300/1	IRIS	9/21/2012
	Subchronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Respiratory	100/1	PPRTV	8/25/2008
Cobalt	Chronic	6.0E-06	mg/m3	1.7E-06	(mg/kg/day)	Respiratory	300/1	PPRTV	8/25/2008
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	Chronic	5.0E-05	mg/m³	1,4E-05	(mg/kg/day)	Central Nervous System	1000/1	IRIS	9/21/2012

# TABLE 5.2 NON-CANCER TOXICITY DATA -- INHALATION FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

### PAGE 2 OF 2

#### Notes:

- 1 Extrapolated RfD = RfC \*20m³/day / 70 kg
- 2 Values are for hexavalent chromium.

#### Definitions:

IRIS = Integrated Risk Information System

NA = Not Applicable

ATSDR = Agency for Toxic Substances and Disease Registry.

Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

Cal EPA(2) = Technical Support Document For the Derivation of Noncancer Reference Exposure Levels, December 2008.

HEAST = Health Effects Assessment Summary Tables

NYSDOH = Final Report, Trichloroethene Air Criteria Document, New "York State Department of Health, October, 2006

PPRTV = Provisional Peer Reviewed Toxicity Value.

RAGS Part D Table 6

**Cancer Toxicity Data** 

## LIST OF TABLES RAGS PART D TABLE 6 CANCER TOXICITY DATA

## Table No.

6-1 Cancer Toxicity Data - Oral/Dermal 6-2 Cancer Toxicity Data - Inhalation

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

FORMER ROBERT E. DERECKTOR SHIPYARD

NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Chemical of Potential	Oral Cancer	Slope Factor	Oral Absorption Efficiency	Absorbed Cancer Slope Factor for Dermaf <sup>(2)</sup>		Weight of Evidence/ Cancer Guideline	Oral CSF	
Concern	Value Units		for Dermal <sup>(1)</sup>	Value Units		Description	Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds								
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	9/21/2012
Tetrachloroethene	2.1E-03	(mg/kg/day) <sup>-1</sup>	1	2.1E-03	(mg/kg/day) <sup>-1</sup>	Likely to be carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - non-mutagen <sup>(3,4)</sup>	3.7E-02	(mg/kg/day) <sup>-1</sup>	1	3.7E-02	(mg/kg/day) <sup>-1</sup>	Carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - mutagen <sup>(3,4)</sup>	9.3E-03	(mg/kg/day)	1	9.3E-03	(mg/kg/day) <sup>-1</sup>	Carcinogenic to humans	IRIS	9/21/2012
Vinyl Chloride <sup>(3)</sup>	7.2E-01	(mg/kg/day) <sup>-1</sup>	1	7.2E-01	(mg/kg/day) <sup>-1</sup>	A / Known human carcinogen	IRIS	9/21/2012
Semivolatile Organic Compounds								
Benzo(a)anthracene <sup>(3)</sup>	7.3E-01	(mg/kg/day) <sup>-1</sup>	1	7.3E-01	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	USEPA(1)	7/1993
Benzo(a)pyrene <sup>(3)</sup>	7.3E+00	(mg/kg/day) <sup>-1</sup>	1	7.3E+00	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	IRIS	9/21/2012
Benzo(b)fluoranthene <sup>(3)</sup>	7.3E-01	(mg/kg/day) <sup>-1</sup>	1	7.3E-01	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	USEPA(1)	7/1993
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	9/21/2012
Benzo(k)fluoranthene <sup>(3)</sup>	7.3E-02	(mg/kg/day)-1	1	7.3E-02	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	USEPA(1)	7/1993
Chrysene <sup>(3)</sup>	7.3E-03	(mg/kg/day) <sup>-1</sup>	1	7.3E-03	(mg/kg/day)-1	B2 / Probable human carcinogen	USEPA(1)	7/1993
Dibenzo(a,h)anthracene(3)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1	7.3E+00	(mg/kg/day)-1	B2 / Probable human carcinogen	USEPA(1)	7/1993
Indeno(1,2,3-cd)pyrene(3)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1	7.3E-01	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	USEPA(1)	7/1993
Pesticides/PCBs								
Total Aroclors	2.0E+00	(mg/kg/day) <sup>-1</sup>	1	2.0E+00	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	IRIS	9/21/2012
Inorganics								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	(mg/kg/day) <sup>-1</sup>	1	1.5E+00	(mg/kg/day) <sup>-1</sup>	A / Known human carcinogen	IRIS	9/21/2012
Beryllium	NA	NA	NA	NA	NA	Carcinogenic potential cannot be determined	IRIS	9/21/2012
Cadmium	NA	NA	NA	NA	NA	B1 / Probable human carcinogen	IRIS	9/21/2012
Chromium <sup>(3,5)</sup>	5.0E-01	(mg/kg/day) <sup>-1</sup>	0.025	2.0E+01	(mg/kg/day) <sup>-1</sup>	D (Not classifiable as to human carcinogenicity)	NJDEP	4/8/2009
Cobalt	NA	NA	NA	NA	NA	NA NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA NA	NA	NA
Lead	NA	NA	NA	NA	NA NA	B2 / Probable human carcinogen	IRIS	9/21/2012
Manganese	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	9/21/2012

#### TABLE 6.1

## CANCER TOXICITY DATA -- ORAL/DERMAL FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

#### Notes

- 1 USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
- 2 Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral absorption efficiency for dermal.
- 3 Trichloroethene, vinyl chloride, carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).
- 4 See text for a discussion of trichloroethene toxicity.
- 5 Values are for hexavalent chromium.

IRIS = Integrated Risk Information System.

NA = Not Available.

Cal EPA = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

NJDEP = New Jersey Department of Environmental Protection.

USEPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

# TABLE 6.2 CANCER TOXICITY DATA -- INHALATION FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Chemical of Potential	Unit	Risk		on Cancer Factor <sup>(1)</sup>	Weight of Evidence/ Cancer Guideline	Unit Risk : I	nhalation CSF
Concern	Value	Units	Value	Units	Description	Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds							
cis-1,2-Dichloroethene	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	9/21/2012
Tetrachloroethene	2.6E-07	(ug/m³) <sup>-1</sup>	9.1E-04	(mg/kg/day) <sup>-1</sup>	Likely to be carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - non-mutagen <sup>(2,3)</sup>	3.1E-06	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.1E-02	(mg/kg/day) <sup>-1</sup>	Carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - mutagen <sup>(2,3)</sup>	1.0E-06	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.5E-03	(mg/kg/day) <sup>-1</sup>	Carcinogenic to humans	IRIS	9/21/2012
Vinyl Chloride	4.4E-06	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.5E-02	(mg/kg/day) <sup>-1</sup>	A / Known human carcinogen	IRIS	9/21/2012
Semivolatile Organic Compounds							
Benzo(a)anthracene <sup>(2)</sup>	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-01	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Benzo(a)pyrene <sup>(2)</sup>	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E+00	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Benzo(b)fluoranthene <sup>(2)</sup>	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-01	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Benzo(g,h,i)perylene	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	9/21/2012
Benzo(k)fluoranthene <sup>(2)</sup>	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-01	(mg/kg/day) <sup>-1</sup>	NA NA	Cal EPA	9/2009
Chrysene <sup>(2)</sup>	1.1E-05	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-02	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Dibenzo(a,h)anthracene <sup>(2)</sup>	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	4.2E+00	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Indeno(1,2,3-cd)pyrene <sup>(2)</sup>	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-01	(mg/kg/day) <sup>-1</sup>	NA	Cal EPA	9/2009
Pesticides/PCBs							
Total Aroclors	1.0E-04	(ug/m3) <sup>-1</sup>	3.5E-01	(mg/kg/day) <sup>-1</sup>	B2 / Probable human carcinogen	IRIS	9/21/2012
Inorganics							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.5E+01	(mg/kg/day) <sup>-1</sup>	A / Known human carcinogen	IRIS	9/21/2012
Beryllium	2.4E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	8.4E+00	(mg/kg/day) <sup>-1</sup>	B1 /Known/likely human carcinogen	IRIS	9/21/2012
Cadmium	1.8E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.3E+00	(mg/kg/day) <sup>-1</sup>	B1 /Known/likely human carcinogen	IRIS	9/21/2012
Chromium <sup>(2,4)</sup>	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.9E+02	(mg/kg/day) <sup>-1</sup>	A / Known human carcinogen	IRIS	9/21/2012
Cobalt	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.2E+01	(mg/kg/day) <sup>-1</sup>	NA	PPRTV	8/25/2008
Iron	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	9/21/2012
Manganese	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	9/21/2012

# TABLE 6.2 CANCER TOXICITY DATA -- INHALATION FORMER ROBERT E. DERECKTOR SHIPYARD NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

### Notes:

- 1 Inhalation CSF = Unit Risk \* 70 kg / 20m3/day.
- 2 Trichloroethene, vinyl chloride, carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).
- 3 See text for a discussion of trichloroethene toxicity.
- 4 Values are for hexavalent chromium.

### Definitions:

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System.

NA = Not Available.

Cal EPA = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

PPRTV = Provisional Peer Reviewed Toxicity Value.

### RAGS Part D Table 7

**Calculation of Cancer Risks and Non-Cancer Hazards** 



### LIST OF TABLES RAGS PART D TABLE 7 - NORTH WATERFRONT CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

### Table No. Reasonable Maximum Exposures 7.1.RME Current Adolescent Trespassers - North Waterfront 7.2.RME Current Adult Trespassers - North Waterfront 7.3.RME Current Industrial Workers - North Waterfront 7.4.RME Future Adolescent Trespassers - North Waterfront Future Adult Trespassers - North Waterfront 7.5.RME 7.6.RME Future Industrial Workers - North Waterfront Current/Future Construction Workers - North Waterfront 7.7.RME 7.8.RME Hypothetical Child Residents - North Waterfront 7.9.RME Hypothetical Adult Residents - North Waterfront

### TABLE 7.1.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	tions			Non-Ca	ncer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Init Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfl	D/RfC	Hazard Quotler
							Value	Units	Value	Units		Value	Units	Value	Units	
iurface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.232	mg/kg	2.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.9E-08	6.1E-08	(mg/kg/day)	NA	(mg/kg/day)	
		•	i	Benzo(a)pyrene	0.165	mg/kg	1.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.4E-07	4.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
	İ			Benzo(b)fluoranthene	0.263	mg/kg	3.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.2E-08	6.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	Chrysene	0.238	mg/kg	2.7E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	2.0E-10	6.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
	ŀ			Dibenzo(a,h)anthracene	0.124	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.0E-07	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.099	mg/kg	1.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	8.1E-09	2.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Chromium VI	10.8	mg/kg	1.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	6.1E-07	2.8E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0009
				Cobalt	6.98	mg/kg	2.6E-07	(mg/kg/day)	NA	(mg/kg/day)-1		1.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.006
				Iron	18,800	mg/kg	7.1E-04	(mg/kg/day)	NA	(mg/kg/day)		4.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.007
				Manganese	229	mg/kg	8.6E-06	(mg/kg/day)	NA	(mg/kg/day)		6.0E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003
			Exp. Route Total			•				•	9.0E-07	ľ				0.02
			Dermal	Benzo(a)anthracene	0.232	mg/kg	7.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	5.5E-08	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.165	mg/kg	5.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	3.9E-07	1.2E-07	(mg/kg/day)	NA.	(mg/kg/day)	
				Benzo(b)fluoranthene	0.263	mg/kg	8.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	6.2E-08	2.0E-07	(mg/kg/day)	NA.	(mg/kg/day)	
				Chrysene	0.238	mg/kg	7.7E-08	(mg/kg/day)	7.3E-03	(mg/kg/day)	5.6E-10	1.8E-07	(mg/kg/day)	NA.	(mg/kg/day)	
			1	Dibenzo(a,h)anthracene	0.124	mg/kg	4.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)	2.9E-07	9.3E-08	(mg/kg/day)	NA.	(mg/kg/day)	
			ł	Indeno(1,2,3-cd)pyrene	0.099	mg/kg	3.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	2.3E-08	7.4E-08	(mg/kg/day)	NA.	(mg/kg/day)	
				Chromium VI	10.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	6.98	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				iron	18,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
		*	Exp. Route Total	1						1 . 5 5 77	8.2E-07					
		Exposure Point Total		<u></u>					····		1.7E-06					0.02
	Exposure Medium Total			<del>``</del>							1.7E-06				<del></del>	0.02
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	2.1E-11	mg/m³	2.0E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.2E-14	4.6E-13	(mg/m³)	NA	(mg/m³)	
				Benzo(a)pyrene	1.5E-11	mg/m <sup>3</sup>	1.4E-13	(mg/m³)	1.1E-03	(ug/m³)-1	1.5E-13	3.3E-13	(mg/m³)	NA.	(mg/m³)	
				Benzo(b)fluoranthene	2.4E-11	mg/m <sup>3</sup>	2.2E-13	(mg/m³)	1.1E-04	(ug/m³)-1	2.5E-14	5.2E-13	(mg/m³)	NA	(mg/m³)	ł
			[	Chrysene	2.2E-11	mg/m <sup>3</sup>	2.0E-13	(mg/m³)	1.1E-05	(ug/m³)-1	2.2E-15	4.7E-13	(mg/m³)	NA	(mg/m³)	
				Dibenzo(a,h)anthracene	1.1E-11	mg/m³	1.1E-13	(mg/m³)	1.2E-03	(ug/m³)-1	1.3E-13	2.5E-13	(mg/m³)	NA	(mg/m³)	
				Indeno(1,2,3-cd)pyrene	9.0E-12	mg/m <sup>3</sup>	8.5E-14	(mg/m³)	1.1E-04	(ug/m³)-1	9.3E-15	2.0E-13	(mg/m <sup>3</sup> )	NA.	(mg/m <sup>3</sup> )	
				Chromium VI	9.8E-10	mg/m³	9.2E-12	(mg/m³)	8.4E-02	(ug/m³)-1	7.7E-10	2.2E-11	(mg/m³)	1.0E-04	(mg/m³)	2.2E-7
				Cobalt	6.3E-10	mg/m <sup>3</sup>	2.0E-12	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> )-1	1.8E-11	1.4E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000002
				Iron	1.7E-6	mg/m <sup>3</sup>	5.4E-09	(mg/m³)	NA.	(ug/m³)-1		3.7E-08	(mg/m³)	NA.	(mg/m³)	
		1	1	Manganese	2.1E-8	mg/m³	6.5E-11	(mg/m³)	NA.	(ug/m³)-1		4.6E-10	(mg/m³)	5.0E-05	(mg/m³)	0.000009
	1		Exp. Route Total	1	1	1	1	(1119111)		1 (Mg/III /	7.9E-10	1	(9/		i (a)	0.00001
		Exposure Point Total	Exp. House Total		<del></del>		<del> </del>				7.9E-10					0.00001
	E. Madine Title	Exposure Point Total			· · · · · · · · · · · · · · · · · · ·		<del> </del>				7.9E-10	<u> </u>				0.00001
Medium Total	Exposure Medium Total															
							11				1.7E-06					0.02

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.2 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timetrame: Current Receptor Population: Trespassers Receptor Age: Adult

	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	cer Risk Calcula	tions			Non-Ca	ncer Hazard Ci	alculations	
				Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Init Risk	Cancer Risk	Intake/Exposur	e Concentration	Rft	D/RfC	Hazard Quotie
						l	Value	Units	Value	Units		Value	Units	Value	Units	1
ace Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.232	mg/kg	1.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	9.1E-09	4.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
			i .	Benzo(a)pyrene	0.165	mg/kg	8.9E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	6.5E-08	3.1E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.263	mg/kg	1.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.0E-08	4.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.238	mg/kg	1.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	9.3E-11	4.5E-08	(mg/kg/day)	NA	(mg/kg/day)	
	i		1	Dibenzo(a,h)anthracene	0.124	mg/kg	6.7E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) 1	4.9E-08	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	indeno(1,2,3-cd)pyrene	0.099	mg/kg	5.3E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.9E-09	1.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
	1			Chromium VI	10.8	mg/kg	5.8E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	2.9E-07	2.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0007
		ļ		Cobalt	6.98	mg/kg	3.7E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				Iron	18,800	mg/kg	1.0E-03	(mg/kg/day)	NA	(mg/kg/day).1		3.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.005
				Manganese	229	mg/kg	1.2E-05	(mg/kg/day)	NA.	(mg/kg/day) 1		4.3E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.002
			Exp. Route Total					•			4.3E-07					0.01
			Dermal	Benzo(a)anthracene	0.232	mg/kg	6.5E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.7E-09	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
			ł	Benzo(a)pyrene	0.165	ma/ka	4.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	3.4E-08	1.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
			ŀ	Benzo(b)fluoranthene	0.263	mg/kg	7.3E-09	(mg/kg/day)	7.3E-01	(mg/kg/day)	5.3E-09	2.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
			ľ	Chrysene	0.238	ma/ka	6.6E-09	(mg/kg/day)	7.3E-03	(mg/kg/day)	4.8E-11	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
			[	Dibenzo(a,h)anthracene	0.124	mg/kg	3.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	2.5E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
			į.	Indeno(1,2,3-cd)pyrene	0.099	mg/kg	2.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day)	2.0E-09	9.6E-09	(mg/kg/day)	NA	(mg/kg/day)	
			ŀ	Chromium VI	10.8	rng/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day).'		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobait	6.98	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
			ļ	Iron	18,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total	in any and a second			1	(55)/		(mg/kg/day)	7.1E-08		, , , , , , , , , , , , , , , , , , , ,			·
		Exposure Point Total	Exp. House Folds	<u> </u>							5.0E-07		* .			0.01
	Exposure Medium Total	Exposure Folia Total					-				5.0E-07					0.01
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	2.1E-11	mg/m³	1.3E-13	(mg/m³)	1.1E-04	(ug/m³)·1	1.5E-14	4.6E-13	(mg/m³)	NA	(mg/m³)	
			ĺ	Benzo(a)pyrene	1.5E-11	mg/m³	9.4E-14	(mg/m <sup>3</sup> )	1.1E-03	(ug/m <sup>3</sup> )·1	1.0E-13	3.3E-13	(mg/m³)	NA	(ma/m³)	
				Benzo(b)fluoranthene	2.4E-11	mg/m³	1.5E-13	(mg/m³)	1.1E-04	(ug/m³)-1	1.6E-14	5.2E-13	(mg/m³)	NA	(mg/m³)	
	1			Chrysene	2.2E-11	mg/m³	1.4E-13	(mg/m³)	1.1E-05	(ug/m³)·1	1.5E-15	4.7E-13	(mg/m³)	NA	(mg/m³)	
	1			Dibenzo(a,h)anthracene	1.1E-11	mg/m <sup>3</sup>	7.1E-14	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> )-1	8.5E-14	2.5E-13	(mg/m³)	NA	(mg/m <sup>3</sup> )	
	ì			Indeno(1,2,3-cd)pyrene	9.0E-12	mg/m³	5.6E-14	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	6.2E-15	2.0E-13	(mg/m³)	NA	(rng/m³)	
	1		ł	Chromium VI	9.8E-10	mg/m³	6.1E-12	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> )-1	5.2E-10	2.2E-11	(mg/m³)	1.0E-04	(mg/m³)	2.2E-7
			ŀ	Cobalt	6.3E-10	mg/m <sup>3</sup>	4.0E-12	(mg/m³)	9.0E-03	(ug/m³)-1	3.6E-11	1.4E-11	(mg/m <sup>3</sup> )	6.0E-06	(mg/m³)	0.000002
			ľ	Iron	1.7E-6	mg/m <sup>3</sup>	1.1E-08	(mg/m³)	NA.	(ug/m³)-1		3.7E-08	(mg/m³)	NA	(mg/m³)	
			1	Manganese	2.1E-8	mg/m <sup>3</sup>	1.3E-10	(mg/m³)	NA.	(ug/m³)-1		4.6E-10	(mg/m³)	5.0E-05	(mg/m³)	0.000009
			Exp. Route Total	1	1 2	1 1119/111	1	1 (1119-1117)		( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	5.5E-10		(9)		(···g····)	0.00001
	i		A CAP HOUSE TOTAL	<u> </u>		,	<del> </del>				5.5E-10					0.00001
	1	Exposure Point Total														
	Exposure Medium Total	Exposure Point Total							-		5.5E-10					0.00001
Medium Total	Exposure Medium Total	Exposure Point Total									5.5E-10 5.0E-07					

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guldance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.3 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current

Receptor Population: Industrial Workers

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	Ė	PC		Car	ncer Risk Calcule	itions			Non-Ca	incer Hazard C	alculations	
	· ·	'	1	Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	e Concentration	Rfl	D/RfC	Hazard Quotie
					<u> </u>		Value	Units	Value	Units		Value	Units	Value	Units	l
urface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.232	mg/kg	8.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	5.9E-08	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.165	mg/kg	5.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	4.2E-07	1.6E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
	ì			Benzo(b)fluoranthene	0.263	mg/kg	9.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6.7E-08	2.6E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
				Chrysene	0.238	mg/kg	8.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	6.1E-10	2.3E-07	(mg/kg/day)	NA.	(mg/kg/day)	-
				Dibenzo(a,h)anthracene	0.124	mg/kg	4.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.2E-07	1.2E-07	(mg/kg/day)	NA.	(mg/kg/day)	-
			i .	Indeno(1,2,3-cd)pyrene	0.099	mg/kg	3.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.5E-08	9.7E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Chromium VI	10.8	mg/kg	3.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)-1	1.9E-06	1.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004
			1	Cobalt	6.98	mg/kg	2.4E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		6.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Iron	18,800	mg/kg	6.6E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.8E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.03
	i			Manganese	229	mg/kg	8.0E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.009
	i		Exp. Route Total	1							2.8E-06					0.06
			Dermal	Benzo(a)anthracene	0.232	mg/kg	7.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	5.1E-08	1.9E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
				Benzo(a)pyrene	0.165	mg/kg	4.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.6E-07	1.4E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
			1	Benzo(b)fluoranthene	0.263	mg/kg	7.9E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	5.8E-08	2.2E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
			ŀ	Chrysene	0.238	mg/kg	7.1E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	5.2E-10	2.0E-07	(mg/kg/day)	NA.	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.124	mg/kg	3.7E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)	2.7E-07	1.0E-07	(mg/kg/day)	NA.	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.099	mg/kg	3.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	2.2E-08	8.3E-08	(mg/kg/day)	NA.	(mg/kg/day)	
				Chromium VI	10.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	6.98	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	18.800	ma/ka	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day).1		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	-
			Exp. Route Total	Manganoso		99	0.02.00	1 (997)		1 (gg 55)	7.6E-07	1	1 1 3 0 3			-
		Exposure Point Total	LAP: House Folds				i				3.5E-06		_		-	0.06
	Exposure Medium Total	Exposure rount rotal									3.5E-06					0.06
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	2.1E-11	mg/m³	1.7E-12	(mg/m³)	1.1E-04	(ug/m³)-1	1.9E-13	4.8E-12	(mg/m³)	NA NA	(mg/m³)	
	F"	THOILE WATERING	1	Benzo(a)pyrene	1.5E-11	mg/m³	1.2E-12	(mg/m³)	1.1E-03	(ug/m³)-1	1.3E-12	3.4E-12	(mg/m³)	NA	(mg/m³)	
				Benzo(b)fluoranthene	2.4E-11	mg/m³	1.9E-12	(mg/m³)	1.1E-04	(ug/m³).1	2.1E-13	5.5E-12	(mg/m³)	NA	(mg/m <sup>3</sup> )	
				Chrysene	2.2E-11	mg/m³	1.8E-12	(mg/m³)	1.1E-05	(ug/m <sup>3</sup> )-1	1.9E-14	4.9E-12	(mg/m³)	NA	(mg/m³)	
				Dibenzo(a.h)anthracene	1.1E-11	mg/m³	9.2E-13	(mg/m³)	1.2E-03	(ug/m³)-1	1.1E-12	2.6E-12	(mg/m³)	NA	(mg/m³)	
				Indeno(1,2,3-cd)pyrene	9.0E-12	mg/m³	7.3E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ).1	8.1E-14	2.1E-12	(mg/m³)	NA	(mg/m <sup>3</sup> )	
				Chromium VI	9.8E-10	mg/m <sup>3</sup>	B.0E-11	(mg/m³)	8.4E-02	(ug/m³)-1	6.7E-09	2.2E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000002
				Cobalt	6.3E-10	mg/m <sup>3</sup>	5.2E-11	(mg/m³)	9.0E-03	(ug/m³)-1	4.7E-10	1.4E-10	(mg/m³)	6.0E-06	(mg/m <sup>3</sup> )	0.00002
				Iron	1.7E-6	mg/m <sup>3</sup>	1.4E-07	(mg/m³)	NA.	(ug/m³)-1		3.9E-07	(mg/m³)	NA	(mg/m³)	_
				Manganese	2.1E-8	mg/m³	1.7E-09	(mg/m³)	NA NA	(ug/m³)-1		4.8E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00010
			Exp. Route Total	I via i gai 1030	2.100	i iigiii	1	1 (1119/1117)	1	1 723/11/	7.2E-09	1	1 (9)		, (g)	0.0001
		Francisco Delet Trans	Exp. Houle Total	I			<b> </b>				7.2E-09					0.0001
		Exposure Point Total					<del></del>					<del> </del>				0.0001
	Exposure Medium Total										7.2E-09	·				
Medium Total							II				3.5E-06	JL				0.06

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.4 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	·
į				Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
1				l			Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.207	mg/kg	2.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	1.7E-08	5.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	Benzo(a)pyrene	0.161	mg/kg	1.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.3E-07	4.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	Benzo(b)fluoranthene	0.251	mg/kg	2.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	2.1E-08	6.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.209	mg/kg	2.4E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.7E-10	5.5E-08	(mg/kg/day)	NA.	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.124	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.0E-07	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	1.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	9.0E-09	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
		1	1	Chromium VI	13.5	mg/kg	1.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-3</sup>	7.6E-07	3.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001
				Cobalt	7.90	mg/kg	3.0E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.007
				Iron	17,425	mg/kg	6.5E-04	(mg/kg/day)	NA.	(mg/kg/day)		4.6E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.007
1			Exp. Route Total				1				1.0E-06	]				0.01
			Dermai	Benzo(a)anthracene	0.207	mg/kg	6.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.9E-08	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	
			i	Benzo(a)pyrene	0.161	mg/kg	5.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.8E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	
	ľ	į.		Benzo(b)fluoranthene	0.251	mg/kg	8.1E-08	(mg/kg/day)	7.3É-01	(mg/kg/day) <sup>-1</sup>	5.9E-08	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	
d.		ł.		Chrysene	0.209	mg/kg	6.7E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	4.9E-10	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	
		ļ.	1	Dibenzo(e,h)anthracene	0.124	mg/kg	4.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	2.9E-07	9.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	3.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.6E-08	8.2E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
	1			Chromium VI	13.5	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	-
			1	Cobalt	7.90	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
l				Iron	17,425	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
		1	Exp. Route Total	1							8.0E-07					
		Exposure Point Total					1				1.8E-06					0.01
	Exposure Medium Total	12									1.8E-06					0.01
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.9E-11	mg/m³	1.8E-13	(mg/m³)	1.1E-04	(ug/m³) <sup>-1</sup>	1.9E-14	4.1E-13	(mg/m³)	NA	(mg/m³)	
				Benzo(a)pyrene	1.5E-11	mg/m <sup>3</sup>	1.4E-13	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.5E-13	3.2E-13	(mg/m <sup>3</sup> )	NA	(mg/m³)	
			•	Benzo(b)fluoranthene	2.3E-11	mg/m <sup>3</sup>	2.1E-13	(mg/m <sup>3</sup> )	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.4E-14	5.0E-13	(mg/m³)	NA	(mg/m³)	1
		i		Chrysene	1.9E-11	mg/m <sup>3</sup>	1.8E-13	(mg/m³)	1.1E-05	(ug/m³) <sup>-1</sup>	2.0E-15	4.2E-13	(mg/m³)	NA	(mg/m³)	-
				Dibenzo(a,h)anthracene	1.1E-11	mg/m <sup>3</sup>	1.1E-13	(mg/m³)	1.2E-03	(ug/m³)-1	1.3E-13	2.5E-13	(mg/m³)	NA	(mg/m <sup>3</sup> )	-
				Indeno(1,2,3-cd)pyrene	9.9E-12	mg/m³	9.3E-14	(mg/m <sup>3</sup> )	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.0E-14	2.2E-13	(mg/m³)	NA	(mg/m³)	
1	1	1		Chromium VI	1.2E-9	mg/m³	1.2E-11	(mg/m <sup>3</sup> )	8.4E-02	(ug/m <sup>3</sup> )-1	9.7E-10	2.7E-11	(mg/m³)	1.0E-04	(mg/m³)	2.7E-7
		i		Cobalt	7.2E-10	mg/m³	2.2E-12	(mg/m <sup>3</sup> )	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.0E-11	1.6E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000003
	}	1	1	Iron	1.6E-6	mg/m <sup>3</sup>	5.0E-09	(mg/m³)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		3.5E-08	(mg/m³)	NA	(mg/m³)	
		1	Exp. Route Total								9.9E-10	]				0.000003
		Exposure Point Total									9.9E-10					0.000003
	Exposure Medium Total		-,	· · · · · · · · · · · · · · · · · · ·				·			9.9E-10	i				0.000003
Medium Total	Exposure incurant rotal										1.8E-06					0.01

### TABLE 7.4.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Ca	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	A:0	D/RfC	Hazard Quotier
			1				Value	Units	Value	Units		Value	Units	Value	Units	
ubsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Benzo(a)pyrene	0.044	mg/kg	5.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)	3.6E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.023	mg/kg	2.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.9E-08	6.1E-09	(mg/kg/day)	NA	(mg/kg/day)	
		l .		Aluminum	7,510	mg/kg	2.8E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.0E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
	Į.	ŀ		Chromium VI	11.0	mg/kg	1.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	6.2E-07	2.9E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0010
				Cobalt	8.68	mg/kg	3.3E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.008
				Iron	20,100	mg/kg	7.6E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		5.3E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.008
		1	Exp. Route Total							· -	6.8E-07	li e				0.02
			Dermal	Benzo(a)pyrene	0.044	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.0E-07	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.023	mg/kg	7.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)	5.5E-08	1.8E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Aluminum	7,510	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Chromium VI	11.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	8.68	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
		<u> </u>		Iron	20,100	mg/kg	0.0E+00	(mg/kg/day)_	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total								1.6E-07	)				
		Exposure Point Total									8.3E-07					0.02
	Exposure Medium Total										8.3E-07					0.02
	Air	North Waterfront	Inhalation	Benzo(a)pyrene	4.0E-12	mg/m <sup>3</sup>	3.8E-14	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	4.1E-14	8.8E-14	(mg/m³)	NA	(mg/m³)	
				Dibenzo(a,h)anthracene	2.1E-12	mg/m³	2.0E-14	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.4E-14	4.6E-14	(mg/m <sup>3</sup> )	NA	(mg/m³)	
				Aluminum	6.8E-7	mg/m <sup>3</sup>	2.1E-09	(mg/m³)	NA.	(ug/m³)-1		1.5E-08	(mg/m³)	5.0E-03	(mg/m <sup>3</sup> )	0.000003
				Chromium VI	1.0E-9	mg/m³	9.4E-12	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> )-1	7.9E-10	2.2E-11	(mg/m³)	1.0E-04	(mg/m³)	2.2E-7
				Cobalt	7.9E-10	mg/m <sup>3</sup>	2.5E-12	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.2E-11	1.7E-11	(mg/m <sup>3</sup> )	6.0E-06	(mg/m³)	0.000003
				Iron	1.8E-6	mg/m³	5.7E-09	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		4.0E-08	(mg/m³)	NA	(mg/m <sup>3</sup> )	
			Exp. Route Total								8.1E-10					0.000006
		Exposure Point Total									8.1E-10					0.000006
	Exposure Medium Total										8.1E-10					0.000006
Medium Total	<del></del>				·						8.3E-07	Y				0.02

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.5 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	°C		Car	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration		D/RfC	Hazard Quotient
					1		Value	Units	Value	Units		Value	Units	Value	Units	]
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.207	mg/kg	1.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	8.1E-09	3.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.161	mg/kg	8.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	6.3E-08	3.0E-08	(mg/kg/day)	NA.	(mg/kg/day)	
				Benzo(b)fluoranthene	0.251	mg/kg	1.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	9.8E-09	4.7E-08	(mg/kg/day)	NA.	(mg/kg/day)	
			1	Chrysene	0.209	mg/kg	1.1E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	8.2E-11	3.9E-08	(mg/kg/day)	NA	(mg/kg/day)	- '
	Ì			Dibenzo(a,h)anthracene	0.124	mg/kg	6.7E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	4.9E-08	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	-
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	5.9E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.3E-09	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Chromium VI	13.5	mg/kg	7.2E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	3.6E-07	2.5E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0008
		1		Cobalt	7.90	mg/kg	4.2E-07	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005
				Iron	17,425	mg/kg	9.4E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.3E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.005
			Exp. Houte Total	]			L				5.0E-07	<u> </u>				0.01
			Dermal	Benzo(a)anthracene	0.207	mg/kg	5.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.2E-09	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.161	mg/kg	4.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.3E-08	1.6E-0B	(mg/kg/day)	NA	(mg/kg/day)	]
				Benzo(b)fluoranthene	0.251	mg/kg	7.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	5.1E-09	2.4E-08	(mg/kg/day)	NA	(mg/kg/day)	-
				Chrysene	0.209	mg/kg	5.8E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	4.2E-11	2.0E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.124	mg/kg	3.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)	2.5E-08	1.2E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	3.0E-09	(mg/kg/day)	7.3E-01	(rng/kg/day)	2.2E-09	1.1E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Chromium VI	13.5	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	7.90	mg/kg	0.0E+00	(mg/kg/day)	- NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	-
				Iron	17,425	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	-
			Exp. Route Total	<u> </u>			ļ				6.9E-08					\ <u>-</u>
		Exposure Point Total									5.7E-07					0.01
	Exposure Medium Total										5.7E-07	<u> </u>				0.01
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.9E-11	mg/m³	1.2E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.3E-14	4.1E-13	(mg/m³)	NA	(mg/m³)	-
				Benzo(a)pyrene	1.5E-11	mg/m <sup>3</sup>	9.2E-14	(mg/m³)	1.1E-03	(ug/m³)-1	1.0E-13	3.2E-13	(mg/m³)	NA NA	(mg/m³)	-
				Benzo(b)fluoranthene	2.3E-11	mg/m³	1.4E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.6E-14	5.0E-13	(mg/m³)	NA NA	(mg/m³)	
				Chrysene	1.9E-11	mg/m <sup>3</sup>	1.2E-13	(mg/m³)	1.1E-05	(ug/m³) <sup>-1</sup>	1.3E-15	4.2E-13	(mg/m³)	NA NA	(mg/m³)	**
				Dibenzo(a,h)anthracene	1.1E-11	mg/m³	7.1E-14	(mg/m³)	1.2E-03	(ug/m³)-1	8.5E-14	2.5E-13	(mg/m³)	NA.	(mg/m³)	-
				Indeno(1,2,3-cd)pyrene	9.9E-12	mg/m <sup>3</sup>	6.2E-14	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.8E-15	2.2E-13	(mg/m³)	NA	(mg/m³)	-
			1	Chromium VI	1.2E-9	mg/m <sup>3</sup>	7.7E-12	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.5E-10	2.7E-11	(mg/m³)	1.0E-04	(mg/m³)	2.7E-7
			1	Cobalt	7.2E-10	mg/m <sup>3</sup>	4.5E-12	(mg/m³)	9.0E-03	(ug/m³)	4.0E-11	1.6E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000003
				Iron	1.6E-6	mg/m³	9.9E-09	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		3.5E-08	(mg/m³)	NA	(mg/m³)	-
			Exp. Route Total								6.9E-10					0.000003
		Exposure Point Total									6.9E-10	I				0.000003
	Exposure Medium Total										6.9E-10					0.000003
Medium Total											5.7E-07					0.01

### TABLE 7.5.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timetrame: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	itions		<u></u>	Non-Ca	ncer Hazard C	alculations	
			1	Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Init Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfl	D/RfC	Hazard Quotier
	}						Value	Units	Value	Units		Value	Units	Value	Units	1
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Benzo(a)pyrene	0.044	mg/kg	2.4E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.7E-08	8.3E-09	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.023	mg/kg	1.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) 1	9.1E-09	4.4E-09	(mg/kg/day)	NA	(mg/kg/day)	
	1			Aluminum	7,510	mg/kg	4.0E-04	(mg/kg/day)	NA	(mg/kg/day) 1		1.4E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.001
	1			Chromium VI	11.0	mg/kg	5.9E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)	3.0E-07	2.1E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0007
				Cobalt	8.68	mg/kg	4.7E-07	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005
				Iron	20,100	mg/kg	1.1E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.8E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.005
			Exp. Route Total								3.2E-07					0.01
			Dermal	Benzo(a)pyrene	0.044	mg/kg	1.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	8.9E-09	4.3E-09	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.023	mg/kg	6.5E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	4.7E-09	2.3E-09	(mg/kg/day)	NA.	(mg/kg/day)	
				Aluminum	7,510	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Chromium VI	11.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	-
				Cobalt	8.68	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	20,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total								1.4E-08					
		Exposure Point Total									3.4E-07					0.01
	Exposure Medium Total										3.4E-07					0.01
	Air	North Waterfront	Inhalation	Benzo(a)pyrene	4.0E-12	mg/m <sup>3</sup>	2.5E-14	(mg/m³)	1.1E-03	(ug/m³) <sup>-1</sup>	2.8E-14	8.8E-14	(mg/m³)	NA	(mg/m³)	
			1	Dibenzo(a,h)anthracene	2.1E-12	mg/m <sup>3</sup>	1.3E-14	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.6E-14	4.6E-14	(mg/m³)	NA	(mg/m³)	
				Aluminum	6.8E-7	mg/m³	4.3E-09	(mg/m³)	NA NA	(ug/m³) <sup>-1</sup>		1.5E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000003
				Chromium VI	1.0E-9	mg/m <sup>3</sup>	6.3E-12	(mg/m³)	8.4E-02	(ug/m³) <sup>-1</sup>	5.3E-10	2.2E-11	(mg/m³)	1.0E-04	(mg/m³)	2.2E-7
				Cobalt	7.9E-10	mg/m³	4.9E-12	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	4.4E-11	1.7E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000003
				Iron	1.8E-6	mg/m <sup>3</sup>	1.1E-08	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		4.0E-08	(mg/m <sup>3</sup> )	NA	(mg/m³)	
			Exp. Route Total								5.7E-10	L				0.000006
		Exposure Point Total									5.7E-10					0.000006
	Exposure Medium Total										5.7E-10					0.000006
Medium Total											3.4E-07					0.01

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<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.6 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E4	PC		Car	ncer Risk Calcula	tions		ľ	Non-Ca	ncer Hazard Co	alculations	
Modum				Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposur	re Concentration	Rff	D/RfC	Hazard Quotient
			ł				Value	Units	Value	Units	1	Value	Units	Value	Units	<u>.                                    </u>
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.207	mg/kg	7.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	5.3E-08	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
			1	Benzo(a)pyrene	0.161	mg/kg	5.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	4.1E-07	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	l {
				Benzo(b)fluoranthene	0.251	mg/kg	8.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	6.4E-08	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	i
	(			Chrysene	0.209	mg/kg	7.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	5.3E-10	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.124	mg/kg	4.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.2E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	
		1		Indeno(1,2,3-cd)pyrene	0.109	mg/kg	3.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	2.8E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	1 <b> </b>
				Chromium VI	13.5	mg/kg	4.7E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	2.4E-06	1.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004
				Cobalt	7.90	mg/kg	2.BE-06	(mg/kg/day)	NA NA	(mg/kg/day)		7.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
				Iron	17,425	mg/kg	6.1E-03	(mg/kg/day)	NA NA	(mg/kg/day)-1		1.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.02
	1		Exp. Route Total	1							3.2E-06	1			•	0.05
			Dermai	Benzo(a)anthracene	0.207	mg/kg	6.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.5E-08	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)	
			1	Benzo(a)pyrene	0.161	mg/kg	4.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.5E-07	1.4E-07	(mg/kg/day)	NA.	(mg/kg/day)	l I
	ļ			Benzo(b)!luoranthene	0.251	mg/kg	7.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	5.5E-08	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.209	mg/kg	6.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	4.6E-10	1.8E-07	(mg/kg/day)	NA.	(mg/kg/day)	1 [
				Dibenzo(a,h)anthracene	0.124	mg/kg	3.7E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	2.7E-07	1.0E-07	(mg/kg/day)	NA.	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.109	ma/ka	3.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.4E-08	9.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Chromium VI	13.5	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	7.90	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
			1	Iron	17,425	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	-
			Exp. Route Total	1	77,120	<u></u>		(331)		(mg/ng/sa))	7.5E-07	1	1 . 3 . 7			
		Exposure Point Total	CAP. Hodie Total								4.0E-06					0.05
	5 Section Front	Exposure Point Total									4.0E-06					0.05
	Exposure Medium Total	T 11 11 11 11 11 11 11 11 11 11 11 11 11	1	In the second se	1 105 11	T 3	1.5E-12	1 4 4 35	1.1E-04	4431-1	1.7E-13	4.3E-12	1 (/_3)	NA	(3)	- 0.00
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.9E-11	mg/m³	R	(mg/m³)		(ug/m³)-1	1.7E-13 1.3E-12	3.3E-12	(mg/m³)	NA NA	(mg/m³)	
		ì		Benzo(a)pyrene	1.5E-11	mg/m <sup>3</sup>	1.2E-12	(mg/m³)	1.1E-03	(ug/m³)·1	2.0E-13	5.2E-12	(mg/m³)	NA NA	(mg/m³)	
				Benzo(b)fluoranthene	2.3E-11	mg/m³	1.9E-12	(mg/m³)	1.1E-04	(ug/m³)-1	l .	II .	(mg/m³)	NA NA	(mg/m³)	
				Chrysene	1.9E-11	mg/m <sup>3</sup>	1.5E-12	(mg/m³)	1.1E-05	(ug/m³).1	1.7E-14	4.3E-12 2.6E-12	(mg/m³)	NA NA	(mg/m³)	<u> </u>
				Dibenzo(a,h)anthracene	1.1E-11	mg/m³	9.2E-13	(mg/m³)	1.2E-03	(ug/m³)·1	1.1E-12 8.9E-14	2.6E-12 2.3E-12	(mg/m³)	NA NA	(mg/m³)	
		İ		Indeno(1,2,3-cd)pyrene	9.9E-12	mg/m³	8.1E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) 1		II .	(mg/m³)	1.0E-04	(mg/m³)	0.000003
l		1		Chromium VI	1.2E-9	mg/m³	1.0E-10	(mg/m³)	8.4E-02	(ug/m³)-1	8.4E-09	2.8E-10	(mg/m³)		(mg/m³)	
H				Cobalt	7.2E-10	mg/m <sup>3</sup>	5.9E-11	(mg/m³)	9.0E-03	(ug/m³) 1	5.3E-10	1.6E-10	(mg/m³)	6.0E-06	(mg/m³)	0.00003
				Iron	1.6E-6	mg/m <sup>3</sup>	1.3E-07	(mg/m³)	NA NA	(ug/m³)-'		3.6E-07	(mg/m³)	NA .	(mg/m <sup>3</sup> )	
			Exp. Route Total								8.9E-09					0.00003
		Exposure Point Total									8.9E-09	1				0.00003
	Exposure Medium Total										8.9E-09					0.00003
Medium Total											4.0E-06					0.05
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Benzo(a)pyrene	0.044	mg/kg	1.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	1.1E-07	4.3E-08	(mg/kg/day)	NA	(mg/kg/day)	- 1
				Dibenzo(a,h)anthracene	0.023	mg/kg	8.1E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) 1	5.9E-08	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
		1	1	Aluminum	7,510	mg/kg	2.6E-03	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		7.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.007
				Chromium VI	11.0	mg/kg	3.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	1.9E-06	1.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004
i				Cobalt	8.68	mg/kg	3.0E-06	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		8.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
l	1	ł.		iron	20,100	mg/kg	7.0E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		2.0E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.03
l			Exp. Route Total	<del></del>				1 1 3 3 77		1_0 0 11	2.1E-06	1	1	·		0.07
I		1	Dermal Dermal	Benzo(a)pyrene	0.044	mg/kg	1.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	9.6E-08	3.7E-08	(mg/kg/day)	NA.	(mg/kg/day)	
		ſ	Dellia	Dibenzo(a,h)anthracene	0.023	mg/kg	7.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	5.1E-08	2.0E-08	(mg/kg/day)	NA NA	(mg/kg/day)	l
l	i	i		Aluminum	7,510	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>	3.12-08	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
l l				Chromium VI	11.0	mg/kg mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	8.68	mg/kg mg/kg	0.0E+00	(mg/kg/day)	NA NA			0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
<b>)</b>	ì	1		1	20,100		0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)	1	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
l)	)	1	5 D4- 7 11	Iron	20,100	mg/kg	0.0E+00	(mg/kg/uay)	L NA	(mg/kg/day)"	1.5E-07	0.02.700	(mg/kg/daty)	7.00-01	(mg/kg/ddy)	<del></del>
	j		Exp. Route Total				<del> </del>					<del>                                     </del>				0.07
		Exposure Point Total									2.2E-06	<del> </del>				
l}	Exposure Medium Total						ـــــالـ				2.2E-06			_		0.07

### TABLE 7.6.RME

### CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Cai	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	
	i	1		Potential Concern	Value	Units	Inteke/Exposu	re Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Ri	D/RIC	Hazard Quotier
			J				Value	Units	Value	Units		Value	Units	Value	Units	1
Subsurface Soil	Air	North Waterfront	Inhalation	Benzo(a)pyrene	4.0E-12	mg/m³	3.3E-13	(mg/m³)	1.1E-03	(ug/m³)·1	3.6E-13	9.1E-13	(mg/m³)	NA	(mg/m³)	T
				Dibenzo(a,h)anthracene	2.1E-12	mg/m³	1.7E-13	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.1E-13	4.8E-13	(mg/m³)	NA	(mg/m³)	
				Aluminum	6.8E-7	mg/m³	5.6E-08	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.6E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00003
				Chromium VI	1.0E-9	mg/m <sup>3</sup>	8.2E-11	(mg/m³)	8.4E-02	(ug/m³) <sup>-1</sup>	6.8E-09	2.3E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000002
				Cobalt	7.9E-10	mg/m <sup>3</sup>	6.4E-11	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	5.8E-10	1.8E-10	(mg/m³)	6.0E-06	(mg/m³)	0.00003
				Iron	1.8E-6	mg/m <sup>3</sup>	1.5E-07	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		4.2E-07	(mg/m <sup>3</sup> )	NA NA	(mg/m³)	
			Exp. Route Total				<u>                                     </u>				7.4E-09	l				0.00006
		Exposure Point Total					I				7.4E-09					0.00006
	Exposure Medium Total										7.4E-09					0.00006
Medium Total											2.2E-06					0.07
Groundwater	Groundwater	North Waterfront	Ingestion	cis-1,2-Dichloroethene	4.26	ug/L	1.5E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.2E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.02
				Trichloroethene	12.2	ug/L	4.3E-05	(mg/kg/day)	4.6E-02	(mg/kg/day) <sup>-1</sup>	2.0E-06	1.2E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.2
			1	Vinyl Chloride	1.47	ug/L	5.1E-06	(mg/kg/day)	7.2E-01	(mg/kg/day) <sup>-1</sup>	3.7E-06	1.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
			1	Aluminum	337	ug/L	1.2E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		3.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
			1	Chromium VI	0.508	ug/L	1.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	8.9E-07	5.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
	1		1	Iron	605	ug/L	2.1E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		5.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.008
	1			Manganese	53.9	ug/L	1.9E-04	(mg/kg/day)	NA NA	(mg/kg/day)		5.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
			Exp. Route Total								6.5E-06					0.3
			Dermal	cis-1,2-Dichloroethene	4.26	ug/L	1.7E-07	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		4.8E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0002
				Trichloroethene	12.2	ug/L	6.7E-07	(mg/kg/day)	4.6E-02	(mg/kg/day) <sup>-1</sup>	3.1E-08	1.9E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.004
				Vinyl Chloride	1.47	ug/L	2.5E-08	(mg/kg/day)	7.2E-01	(mg/kg/day) <sup>-1</sup>	1.8E-08	6.9E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00002
			1	Aluminum	337	ug/L	5.3E-07	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.5E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000001
			1	Chromium VI	0.508	ug/L	1.6E-09	(mg/kg/day)	2.0E+01	(mg/kg/day)	3.2E-08	4.5E-09	(mg/kg/day)	7.5É-05	(mg/kg/day)	0.00006
				Iron	605	ug/L	9.6E-07	(mg/kg/day)	NA NA	(mg/kg/day)		2.7E-06	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.000004
				Manganese	53.9	ug/L	8.5E-08	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.4E-07	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.0002
			Exp. Route Total								8.1E-08					0.004
		Exposure Point Total									6.6E-06					0.3
	Exposure Medium Total										6.6E-06					0.3
Medium Total											6.6E-06					0.3
				· · · · · · · · · · · · · · · · · · ·			Ţ	otal Cancer Risks	for Surface Soil	and Groundwater	1.1E-05	Total	Hazard Indices to	r Surface Soil a	and Groundwater	0.4
							Total	Cancer Risks for	Subsurface Soil	and Groundwater	8.9E-06	- Total Ha	zard Indices for Su	bsurface Soil a	and Groundwater	0.4

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.7.RME

### CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES

### FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Cai	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	
	1	·	·	Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfl	D/RfC	Hazard Quotient
	l						Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.207	mg/kg	5.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	3.6E-09	3.5E-07	(mg/kg/day)	NA	(mg/kg/day)	-
				Benzo(a)pyrene	0.161	mg/kg	3.9E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	2.8E-08	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	{
				Benzo(b)fluoranthene	0.251	rng/kg	6.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) 1	4.4E-09	4.2E-07	(mg/kg/day)	NA	(mg/kg/day)	{
ľ			1	Chrysene	0.209	mg/kg	5.0E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	3.7E-11	3.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
i i				Dibenzo(a,h)anthracene	0.124	mg/kg	3.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	2.2E-08	2.1E-07	(mg/kg/day)	NA.	(mg/kg/day)	
l l				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	2.6E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.9E-09	1.8E-07	(mg/kg/day)	NA.	(mg/kg/day)	
1				Chromium VI	13.5	mg/kg	3.2E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	1.6E-07	2.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.001
				Cobalt	7.90	mg/kg	1.9E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004
ĺ		1	L	iron	17,425	mg/kg	4.2E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.9E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
			Exp. Route Total								2.2E-07	1				0.05
<b>[</b>			Dermal	Benzo(a)anthracene	0.207	mg/kg	1.9E-09	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	1.4E-09	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
Į.				Benzo(a)pyrene	0.161	mg/kg	1.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.1E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
			ŀ	Benzo(b)fluoranthene	0.251	mg/kg	2.3E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.7E-09	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	i }
li .				Chrysene	0.209	mg/kg	2.0E-09	(mg/kg/day)	7.3E-03	(mg/kg/day).1	1.4E-11	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	l j
				Dibenzo(a,h)anthracene	0.124	mg/kg	1.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) 1	8.5E-09	8.1E-08	(mg/kg/day)	NA	(mg/kg/day)	
			ŀ	Indeno(1,2,3-cd)pyrene	0.109	mg/kg	1.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day)	7.4E-10	7.1E-08	(mg/kg/day)	NA	(mg/kg/day)	}
li .				Chromium VI	13.5	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	
1				Cobalt	7.90	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	
			<u>t</u>	Iron	17,425	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total								2.3E-08					
		Exposure Point Total	"								2.5E-07	K T				0.05
	Exposure Medium Total	<u> </u>									2.5E-07					0.05
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.5E-7	mg/m³	2.5E-10	(mg/m³)	1.1E-04	(ug/m³)-1	2.8E-11	1.8E-08	(mg/m³)	NA	(mg/m³)	
í			i	Benzo(a)pyrene	1.2E-7	mg/m³	2.0E-10	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> )-1	2.1E-10	1.4E-08	(mg/m³)	NA	(mg/m <sup>3</sup> )	
ĺ			Ī	Benzo(b)fluoranthene	1.8E-7	mg/m³	3.0E-10	(mg/m³)	1.1E-04	(ug/m³)-1	3.3E-11	2.1E-08	(mg/m³)	NA	(mg/m <sup>3</sup> )	
ļ.		1		Chrysene	1.5E-7	mg/m³	2.5E-10	(mg/m³)	1.1E-05	(ug/m <sup>3</sup> )-1	2.8E-12	1.8E-08	(mg/m³)	NA	(mg/m <sup>3</sup> )	
<b>\</b>			ŀ	Dibenzo(a,h)anthracene	8.9E-8	mg/m³	1.5E-10	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.8E-10	1.1E-08	(mg/m³)	NA.	(mg/m <sup>3</sup> )	
l			ŀ	Indeno(1,2,3-cd)pyrene	7.8E-8	mg/m³	1.3E-10	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	1.5E-11	9.2E-09	(mg/m³)	NA	(mg/m <sup>3</sup> )	
			ŀ	Chromium VI	9.6E-6	mg/m³	1.6E-08	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> )-1	1.4E-06	1.1E-06	(mg/m³)	1.0E-04	(mg/m <sup>3</sup> )	0.01
			į	Cobalt	5.6E-6	mg/m <sup>3</sup>	9.6E-09	(mg/m³)	9.0E-03	(ug/m³)-1	8.6E-08	6.7E-07	(mg/m³)	2.0E-05	(mg/m³)	0.03
				Iron	0.012	mg/m³	2.1E-05	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		1.5E-03	(mg/m³)	NA	(mg/m³)	
			Exp. Route Total	1						• • • • • • • • • • • • • • • • • • • •	1.5E-06					0.04
1		Exposure Point Total									1.5E-06					0.04
	Exposure Medium Total			•••••			<del></del>			-	1.5E-06					0.04
Medium Total	Exposuro inculari i ocu	<u></u>									1.7E-06	·				0.09
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Benzo(a)pyrene	0.044	mo/ka	1,1E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	7.7E-09	7.4E-08	(mg/kg/day)	NA.	(mg/kg/day)	***************************************
CONTROL SON	Substitute Still	INORE WAREITORE	(ingestion)	Dibenzo(a,h)anthracene	0.044	mg/kg mg/kg	5.6E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	4.1E-09	3.9E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
<b> </b>			1	Aluminum	7,510	mg/kg	1.8E-04	(mg/kg/day)	NA	(mg/kg/day)	4.12-09	1.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
				Chromium VI	11.0	mg/kg	2.6E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)	1.3E-07	1.8E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0009
1			1	Cobalt	8.68	mg/kg	2.1E-07	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>	1.52-07	1.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
				Iron	20,100	mg/kg	4.8E-04	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		3.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.05
			Exp. Route Total	1	20,100	I my ng	1.02.04	(ingragrady)	1 197	(IIIg/kg/day)	1.4E-07	<del>1                                    </del>	(mg/ng/ddy)	1,02,01	(mg/ng/saly)	0.07
		[		Ponzo(a)nurono	0.044	malka	4.1E-10	/ma/ka/da:/\	7.3E+00	(ma/ka/da: <sup>3-7</sup>	3.0E-09	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	0.07
			Dermal	Benzo(a)pyrene	0.044	mg/kg	2.2E-10	(mg/kg/day) (mg/kg/day)	7.3E+00 7.3E+00	(mg/kg/day) <sup>-1</sup>	1.6E-09	1.5E-08	(mg/kg/day) (mg/kg/day)	NA NA	(mg/kg/day) (mg/kg/day)	·
		[	1	Dibenzo(a,h)anthracene Aluminum	7,510	mg/kg	0.0E+00	(mg/kg/day) (mg/kg/day)	7.3E+00 NA	(mg/kg/day) <sup>-1</sup>	1.6E-09	0.0E+00	(mg/kg/day) (mg/kg/day)	1.0E+00	(mg/kg/day) (mg/kg/day)	
		í	1	Chromium VI	11.0	mg/kg mg/kg	0.0E+00	(mg/kg/day) (mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day) (mg/kg/day)	5.0E-04	(mg/kg/day)	
			i	Cobalt	8.68		0.0E+00	(mg/kg/day) (mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day) (mg/kg/day)	3.0E-03	(mg/kg/day)	i I
1			1	Iron	20,100	mg/kg mg/kg	0.0E+00	(mg/kg/day) (mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day) (mg/kg/day)	7.0E-01	(mg/kg/day) (mg/kg/day)	<u>"</u>
		ł	Eve Doude 7-1-1	1	20,100	I IIIg/Ng	0.02+00	(mg/kg/day)	1 176	(Hig/kg/day)	4.6E-09	0.02+00	(ing/kg/ddy)	7.02-01	(mg/kg/ddy)	
ł		r <u> </u>	Exp. Route Total	<u> </u>			<del></del>		<del></del>		1.5E-07	₽				0.07
		Exposure Point Total						···				<del> </del>				
	Exposure Medium Total						ــــــــــــــــــــــــــــــــــــــ				1.5E-07	<u></u>				0.07

# TABLE 7.7.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timetrame: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	ations			Non-Ca	incer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/I	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	- Af	D/RfC	Hazard Quotier
							Value	Units	Value	Units		Value	Units	Value	Units	7
ubsurface Soif	Air	North Waterfront	Inhalation	Benzo(a)pyrene	3.1E-8	mg/m³	5.3E-11	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	5.9E-11	3.7E-09	(mg/m³)	NA	(mg/m³)	T
	}			Dibenzo(a,h)anthracene	1.7E-8	mg/m³	2.8E-11	(mg/m <sup>3</sup> )	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.4E-11	2.0E-09	(mg/m <sup>3</sup> )	NA	(mg/m <sup>3</sup> )	
	1			Aluminum	0.005	mg/m <sup>3</sup>	9.1E-06	(mg/m³)	NA.	(ug/m³)-1		6.4E-04	(mg/m <sup>3</sup> )	5.0E-03	(mg/m <sup>3</sup> )	0.1
				Chromium VI	7.9E-6	mg/m <sup>3</sup>	1.3E-08	(mg/m <sup>3</sup> )	B.4E-02	(ug/m <sup>3</sup> )-1	1.1E-06	9.3E-07	(mg/m³)	1.0E-04	(mg/m³)	0.009
		l		Cobalt	6.2E-6	mg/m <sup>3</sup>	1.1E-08	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> )-1	9.5E-08	7.4E-07	(mg/m³)	2.0E-05	(mg/m <sup>3</sup> )	0.04
		1		Iron	0.014	mg/m <sup>3</sup>	2.4E-05	(mg/m³)	NA.	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.7E-03	(mg/m <sup>3</sup> )	NA	(mg/m <sup>3</sup> )	
			Exp. Route Total								1.2E-06					0.2
		Exposure Point Total		<u> </u>			1				1.2E-06					0.2
	Exposure Medium Total						1				1.2E-06	·}				0.2
Medium Total							<del></del>				1.4E-06	<del> </del>			-	0.2
Groundwater	Groundwater	North Waterfront	Ingestion	cis-1,2-Dichloroethene	4.26	ug/L	1.5E-08	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.1E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00005
- Carlanato	G. G. G. G. G. G. G. G. G. G. G. G. G. G	110111111111111111111111111111111111111	//igodian	Trichloroethene	12.2	ug/L	4.4E-08	(mg/kg/day)	4.6E-02	(mg/kg/day) <sup>-1</sup>	2.0E-09	3.1E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.006
				Vinyl Chloride	1.47	ug/L	5.3E-09	(mg/kg/day)	7.2E-01	(mg/kg/day)	3.8E-09	3.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001
				Aluminum	337	ug/L	1.2E-06	(mg/kg/day)	NA.	(mg/kg/day)		8.6E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00009
				Chromium VI	0.508	ug/L	1.8E-09	(mg/kg/day)	5.0E-01	(mg/kg/day).1	9.2E-10	1.3E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000006
				Iron	605	ug/L	2.2E-06	(mg/kg/day)	NA	(mg/kg/day)		1.5E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0002
				Manganese	53.9	ug/L	2.0E-07	(mg/kg/day)	NA NA	(mg/kg/day)		1.4E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.0006
			Exp. Route Total	1			1		•	1	6.8E-09	1	4			0.008
			Dermal	cis-1,2-Dichloroethene	4.26	ug/L	9.4E-08	(mg/kg/day)	NA NA	(mg/kg/day)-1		6.6E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0003
				Trichloroethene	12.2	ug/L	3.0E-07	(mg/kg/day)	4.6E-02	(mg/kg/day)-1	1.4E-08	2.1E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.04
			Į.	Vinyl Chloride	1.47	ug/L	1.6E-08	(mg/kg/day)	7.2E-01	(mg/kg/day)-1	1.2E-08	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
			ľ	Aluminum	337	ug/L	6.5E-07	(mg/kg/day)	NA NA	(mg/kg/day)		4.5E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00005
				Chromium VI	0.508	ug/L	1.9E-09	(mg/kg/day)	2.0E+01	(mg/kg/day)	3.9E-08	1.4E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0003
		1 .		Iron	605	ug/L	1.2E-06	(mg/kg/day)	NA NA	(mg/kg/day)		8.1E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0001
				Manganese	53.9	ug/L	1.0E-07	(mg/kg/day)	NA NA	(mg/kg/day)		7.2E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.008
			Exp. Route Total	1			1				6.5E-08					0.05
		Exposure Point Total		<u> </u>							7.2E-08	i				0.06
	Exposure Medium Total			ÇALIAN .			1				7.2E-08	<del> </del>			***************************************	0.06
	Air	North Waterfront	Inhalation	cis-1,2-Dichloroethene	1.6E-4	mg/m³	2.7E-07	(mg/m³)	NA NA	(ug/m³)-1		1.9E-05	(mg/m³)	NA.	(mg/m³)	-
	<u></u>	TVOILT VV GLOTTOIL	minadion	Trichloroethene	3.9E-4	mg/m <sup>3</sup>	6.7E-07	(mg/m³)	4.1E-06	(ug/m³)-1	2.7E-09	4.7E-05	(mg/m³)	5.4E-01	(mg/m <sup>3</sup> )	0.00009
				Vinyi Chloride	6.9E-5	mg/m³	1.2E-07	(mg/m³)	4.4E-06	(ug/m³)-1	5.1E-10	8.2E-06	(mg/m³)	7.7E-02	(mg/m³)	0.0001
				Aluminum	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)-1		0.0E+00	(mg/m³)	5.0E-03	(mg/m³)	
		1		Chromium VI	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	8.4E-02	(ug/m³)-1		0.0E+00	(mg/m³)	1.0E-04	(mg/m³)	
		1	1	iron	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	NA	(ug/m³)-1		0.0E+00	(mg/m³)	l NA	(mg/m³)	
	-	1		Manganese	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	NA	(ug/m³)·1		0.0E+00	(mg/m³)	5.0E-05	(mg/m <sup>3</sup> )	
		1	Exp. Route Total	1		19		1 (9)	·	1 1-2	3.2E-09	1	(	•	, , , , , ,	0.0002
		Exposure Point Total	Lap. Houte Total				<del> </del>				3.2E-09	<del> </del>				0.0002
	Exposure Medium Total										3.2E-09	<del> </del>				0.0002
M. dina T. C.	Exposure Medium Total						╬				7.5E-08	<del> </del>				0.0002
Medium Total					<del></del>		1					<u> </u>	111	. 01 0 "	10	
								otal Cancer Risks			1.8E-06		Hazard Indices fo			
							Tota	Cancer Risks for	Subsurface Soil	and Groundwater	1.4E-06	Total Ha	zard Indices for Su	ubsurface Soil e	and Groundwaler	0.3

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.8.RME

### CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

### REASONABLE MAXIMUM EXPOSURES

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

	Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	T F	PC	r	Car	ncer Risk Calcula	tions		<u> </u>	Non-Ca	ncer Hazard C	alculations	
Page	Wediditi	Exposure medicin	Exposure r ont					Intake/Exposur				Cancer Risk	Intake/Exposu				Hazard Quotient
Defect   D	1					1 *****	l orms										1
Defect   D	Surface Soil	Surface Soil	North Waterfront	Ingestion	Renzo(a)anthracene	0.207	ma/ke				<u> </u>	8.8F-07	2.6E-06	(ma/ka/dev)		(mg/kg/dav)	
Part	Ouriece Still	Surrace Sur	Notin wateritoni	III yesiioi1		1		ll .		1			II .				
Column					1 ' '' '	1		II					II .				
Company of the comp				Ì	1 ''			il				1					
Part   Part	1				1 '	,					1	,	II .				
Content of 1				1	1 '''		1	ll .			1		k			4	
Column		1	1	i			1 " "	ll .			1		H				[
Part   Part		1				1					1	1					i
Part					i	1	1	II		1			u .	1			
Demil   Demil   Demil   Demil   Demil   Demil   Demo					1 Iron	17,425	mg/kg	1.95-02	(mg/kg/day)	INA	(mg/kg/day)		2.25-01	(ilig/kg/day)	7.00-01	(Hig/kg/day)	
Part   Continue   Co		i	1		<u> </u>									1		4	0.7
Security   Company   Com				Dermal	1 ''					1						1	
Compute   Comp					1			II .		1			II .				-
Description   Description			1			1		II .		1		ľ	II .				
March   Marc				,	1 '			11		1		ľ		1			
Chammum W				ľ	1			II .		ı							
Cocal   7.50					1			1		1	1						ŀ
February Point Total   February Point Total								41		1		ľ	II .				
Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Profit Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Medium Total   Epocure Point Total   Epocure Poin	l				1	1		II .			1						i -
Exposure Medium Total					Iron	17,425	mg/kg	0.0E+00	(mg/kg/day)	l NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	<u> </u>
Exposure Medium Total	į			Exp. Route Total	l								<u> </u>				
Ar		<u> </u>	Exposure Point Total														
Bezolalyyene   156-11 mg/m²   6.4E-12 (mg/m²)   1.1E-03 (ug/m²)   7.1E-12   1.4E-11 (mg/m²)   NA (mg/m²)   1.1E-12   1.1E-12 (mg/m²)   1		Exposure Medium Total										5.9E-05	<u> </u>				0.7
Bear College and head   Part   Bear College and head   Section		Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.9E-11	mg/m³	8.2E-12	(mg/m³)	1.1E-04	(ug/m³) <sup>-1</sup>	9.1E-13	1.8E-11			(mg/m³)	
Chypane   Chypane   1,9611   mg/m²   4,9612   (mg/m²)   1,16.03   (ug/m²)*   5,9612   1,1611   (mg/m²)   NA (mg/m²)					Benzo(a)pyrene	1.5E-11	mg/m <sup>3</sup>	6.4E-12	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	7.1E-12	1.4E-11	(mg/m³)		(mg/m³)	
Diseased planthresene   15-11   mg/m²   4.95-12   mg/m²   4.95-12   mg/m²   4.95-12   mg/m²   4.85-13	ji			ŀ	Benzo(b)fluoranthene	2.3E-11	mg/m³	1.0E-11	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.1E-12	2.2E-11	(mg/m³)	NA.	(mg/m³)	
Independ   2.3-ord/pyrane   9.8-12   mg/m²   4.3-12   (mg/m²)   8.45-02   (ug/m²)*   4.8-13   9.55-12   (mg/m²)   1.05-04   (mg/m²)   0.00001	1			ł	Chrysene	1.9E-11	mg/m <sup>3</sup>	8.3E-12	(mg/m <sup>3</sup> )	1.1E-05	(ug/m <sup>3</sup> ) <sup>-1</sup>	9.2E-14	1.8E-11	(mg/m³)	NA	(mg/m³)	
Chromium V1   1,2E,9   mg/m²   5,4E-10   (mg/m²)   9,E-03   (ug/m²)²   4,5E-08   1,2E-09   (mg/m²)   1,0E-04   (mg/m²)   0,00001					Dibenzo(a,h)anthracene	1.1E-11		4.9E-12	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	5.9E-12	1.1E-11	(mg/m³)	NA	(mg/m³)	
Cobat   7.2E-10   mg/m²   5.9E-11   (mg/m²)   9.0E-03   (ug/m²)¹   5.3E-10   (mg/m²)   6.6E-06   (mg/m²)   0.0001     Exp. Route Total				ŀ	Indeno(1,2,3-cd)pyrene	9.9E-12	mg/m <sup>3</sup>	4.3E-12	(mg/m <sup>3</sup> )	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	4.8E-13	9.5E-12	(mg/m³)	NA NA	(mg/m³)	-
Exp. Route Total   Exp. Route	1			r	Chromium VI	1.2E-9	mg/m³	5.4E-10	(mg/m³)	8.4E-02	(ug/m³) <sup>-1</sup>	4.5E-08	1.2E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00001
Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Subsurface Soil   Morth Waterfront   Ingestion   Benzo(a)pyrene   Dibenzo(a,h)anthriscene   D.0.44   mg/kg   2.6E-07   (mg/kg/day)   7.3E-00   (mg/kg/day)   1.6E-05   5.6E-07   (mg/kg/day)   NA   (mg/kg/day)					Cobalt	7.2E-10	mg/m <sup>3</sup>	5.9E-11	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	5.3E-10	6.9E-10	(mg/m³)	6.0E-06	(mg/m³)	0.0001
Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Exposure Medium Total   Subsurface Soil   North Waterfront   Ingestion   Benzo(a)pyrene   0.044   mg/kg   1.4E-07   (mg/kg/day)   7.3E+00   (mg/kg/day)   1.9E-05   0.5E-07   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   (mg/kg/day)   NA   NA   NA   NA   NA   NA   NA   N					Iron	1.6E-6	mg/m³	1.3E-07	(mg/m³)	NA	(ug/m³)-1		1.5E-06	(mg/m³)	NA NA	(mg/m³)	
Exposure Medium Total			l	Exp. Route Total	1		<u> </u>				•	4.6E-08					0.0001
Exposure Medium Total   Subsurface Soil   North Waterfront   Ingestion   Senzo(a)pyrene   0.044   mg/kg   2.6E-07   (mg/kg/day)   7.3E+00   (mg/kg/day)   1.9E-06   5.6E-07   (mg/kg/day)   0.7   0.0E+00   (mg/kg/day)   0.10E+00   (mg/kg/day)   0			Exposure Point Total									4.6E-08	i				0.0001
Medium Total   Subsurface Soil   North Waterfront   Ingestion   Benzo(a)pyrene   0.044   mg/kg   2.6E-07   (mg/kg/day)   7.3E+00   (mg/kg/day)   1.9E-06   5.9E-05   (mg/kg/day)   1.0E-06   0.064   (mg/kg/day)   0.0E-07		Exposure Medium Total										4.6E-08	Ì				0.0001
Subsurface Soil   Subsurface Soil   North Waterfront   Ingestion   Benzo(a)pyrene   Dibanzo(a,h)penthrecene   Dibanzo(a,	Adadisas Takal	Exposure median votal		<del></del>							./		<del>}</del>				
Dibenzo(a,h)anthracene		Cubaudae C-2	North M-t	Ingestica	Bonzo/alpwore	0.044	marka	2.65.07	(malkoldov)	735:00	(ma/ka/dasa <sup>-1</sup>		5.6E-07	(mg/kg/day)	NΔ	(mg/kg/day)	<del></del>
Aluminum 7.510 mg/kg 8.2E-03 (mg/kg/day) NA (mg/kg/day) 9.6E-02 (mg/kg/day) 1.0E+00 (mg/kg/day) 0.10 (mg/kg/day) 0.10 (mg/kg/day) 1.0E+00 (mg/kg/day) 0.10 (mg/kg/day) 0.0E+00 (mg/kg/day) 1.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 1.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 1.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 1.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 1.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 1.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 1.0E+00 (mg/kg/day) 1.0E+00 (mg/kg/day) 1.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 1.0E+00 (mg/kg/	Subsurface Soil	SUDSURIACE SOIF	North waterfront	ingestion		· ·		i		i		4	и			1	
Chromium V    11.0   mg/kg   6.4E-05   (mg/kg/day)   5.0E-01   (mg/kg/day)   3.2E-05   1.4E-04   (mg/kg/day)   3.0E-03   (mg/kg/day)   0.05	}				1			II .					B .				1
Cobalt   B.68 mg/kg   9.5E-06 (mg/kg/day)   NA (mg/kg/d				i				II .	1				4				
Iton   20,100   mg/kg   2.2E-02   (mg/kg/day)   NA   (mg/kg/day)     2.6E-01   (mg/kg/day)   7.0E-01   (mg/kg/day)   0.4			Į.	1				II .					11				
Exp. Route Total				1													1
Dermal   Benzo(a)pyrene   0.044   mg/kg   9.4E-08   (mg/kg/day)   7.3E+00   (mg/kg/day)   3.6E-07   2.0E-07   (mg/kg/day)   NA   (mg/kg/day)			!		_iron	20,100	mg/kg	2.2E-02	(mg/kg/day)	NA NA	(mg/kg/day)		2.66-01	(mg/kg/qay)	7.0E-01	(mg/kg/uay)	
Dibenzo(a,h)anthracene					4	1	T	I	T		T		<del> </del>	T (		I described to	
Aluminum 7,510 mg/kg 0.0E+00 (mg/kg/day) NA (mg/kg/day) 0.0E+00 (mg/kg/day) 1.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 7.5E-05 (mg/kg/day) 0.0E+00 (mg/kg/day) 7.5E-05 (mg/kg/day) 0.0E+00 (mg/kg/day) 7.5E-05 (mg/kg/day) 0.0E+00 (mg/kg/day) 7.5E-05 (mg/kg/day) 0.0E+00 (mg/kg/day) 7.0E-01 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 7.0E-01 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day) 0.0E+00 (mg/kg/day)			1	Dermal			1	II .				i e	II .				1
Chromium V    11.0   mg/kg   0.0E+00   (mg/kg/day)   2.0E+01   (mg/kg/day)     0.0E+00   (mg/kg/day)   7.5E-05   (mg/kg/day)     0.0E+00   (mg/kg/day)   3.0E-04   (mg/kg/day)     0.0E+00   (mg/kg/day)   3.0E-04   (mg/kg/day)     0.0E+00   (mg/kg/day)   3.0E-04   (mg/kg/day)     0.0E+00   (mg/kg/day)   7.0E-01   (mg/kg/day)     0.0E+00   (mg/kg/day)   7.0E-01   (			1	1	1 ' '			II .							1		1
Cobalt   8.68 mg/kg   0.0E+00   (mg/kg/day)   NA   (mg/kg/day)     0.0E+00   (mg/kg/day)   3.0E-04   (mg/kg/day)       0.0E+00   (mg/kg/day)   7.0E-01   (mg/kg/day)     0.0E+00   (mg/kg/day)   7.0E-01   (mg/kg/day)				1				II .					II.				1
Fron   20,100   mg/kg   0.0E+00   (mg/kg/day)   NA   (mg/kg/day)     0.0E+00   (mg/kg/day)   7.0E-01   (mg/kg/day)			l .	1				II .		1			8		1		
Exp. Route Total   1.0E-06			l .	1	Cobalt			II .					B		1		
Exposure Point Total         3.6E-05         0.9			1		Iron	20,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1	ننسب جيسار	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	ļ
Exposure our road		1		Exp. Route Total				<u> </u>					<u></u>				
Exposure Medium Total         3.6E-05         0.9			Exposure Point Total									3.6E-05					0.9
	i	Exposure Medium Total										3.6E-05					0.9

### TABLE 7.8. RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE (SLAND

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	tions			Non-Ca	ncer Hazard C	alculations	
			İ	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfl	D/RfC	Hazard Quotien
			l				Value	Units	Value	Units	1	Value	Units	Value	Units	]
ubsurface Soil	Air	North Waterfront	Inhalation	Benzo(a)pyrene	4.0E-12	mg/m <sup>3</sup>	1.8E-12	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.9E-12	3.8E-12	(mg/m³)	NA	(mg/m³)	
				Dibenzo(a,h)anthracene	2.1E-12	mg/m <sup>3</sup>	9.3E-13	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.1E-12	2.0E-12	(mg/m <sup>3</sup> )	NA	(mg/m³)	
				Aluminum	6.8E-7	mg/m <sup>3</sup>	5.6E-08	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		6.5E-07	(mg/m <sup>3</sup> )	5.0E-03	(mg/m³)	0.0001
		į		Chromium VI	1.0E-9	mg/m³	4.4E-10	(mg/m <sup>3</sup> )	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.7E-08	9.6E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000010
				Cobalt	7.9E-10	mg/m <sup>3</sup>	6.5E-11	(mg/m³)	9.0E-03	(ug/m³) <sup>-1</sup>	5.8E-10	7.6E-10	(mg/m³)	6.0E-06	(mg/m³)	0.0001
				Iron	1.8E-6	mg/m <sup>3</sup>	1.5E-07	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.8E-06	(mg/m³)	NA	(mg/m³)	L
			Exp. Route Total								3.7E-08					0.0003
		Exposure Point Total	•								3.7E-08					0.0003
	Exposure Medium Total										3.7E-08					0.0003
Medium Total	··· - ·										3.6E-05					0.9
Groundwater	Groundwater	North Waterfront	Ingestion	cis-1,2-Dichloroethene	4.26	ug/L.	2.3E-05	(mg/kg/day)	NA	(mg/kg/day)		2.7E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.1
	ł .			Trichloroethene (Mutagenic)	12.2	ug/L	3.6E-04	(mg/kg/day)	9.3E-03	(mg/kg/day) <sup>-1</sup>	3.3E-06	7.8E-04	(mg/kg/day)	NA	(mg/kg/day)	
	ſ		1	Trichloroethene (Nonmutagenic	12.2	ug/L	6.7E-05	(mg/kg/day)	3.7E-02	(mg/kg/day) 1	2.5E-06	7.8E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.6
	i			Vinyl Chloride	1.47	ug/L	1.1E-04	(mg/kg/day)	7.2E-01	(mg/kg/day) <sup>-1</sup>	7.6E-05	9.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.03
	j			Aluminum	337	ug/L	1.8E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
	}		1	Chromium VI	0.508	ug/L	1.5E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	7.4E-06	3.2E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01
	)		1	iron	605	ug/L	3.3E-03	(mg/kg/day)	NA	(mg/kg/day)		3.9E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06
	i			Manganese	53.9	ug/L	3.0E-04	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		3.4E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.1
			Exp. Route Total					-			9.0E-05	)				2.0
		Į.	Dermal	c/s-1,2-Dichloroethene	4.26	ug/L	2.9E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.4E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.02
				Trichloroethene (Mutagenic)	12.2	ug/L	5.8E-05	(mg/kg/day)	9.3E-03	(mg/kg/day) <sup>-1</sup>	5.4E-07	1.3E-04	(mg/kg/day)	NA	(mg/kg/day)	]
	į			Trichloroethene (Nonmutagenic	12.2	ug/L	1.1E-05	(mg/kg/day)	3.7E-02	(mg/kg/day) <sup>-1</sup>	4.0E-07	1.3E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.3
	Į.			Vinyl Chloride	1.47	ug/L	5.8E-06	(mg/kg/day)	7.2E-01	(mg/kg/day) <sup>-1</sup>	4.1E-06	5.1E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
		Y	1	Aluminum	337	ug/L	1.2E-05	(mg/kg/day)	NA.	(mg/kg/day)		1.4E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0001
		ł	1	Chromium VI	0.508	ug/L	2.0E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)	3.9E-06	4.3E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.006
			1	liron	605	ug/L	2.2E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.6E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0004
		l	1	Manganese	53.9	ug/L	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)		2.3E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.02
			Exp. Route Total	i i		<u> </u>	<b> </b>			1	9.0E-06	1			<u> </u>	0.3
		Exposure Point Total	<u> </u>								9.9E-05					2.3
	Exposure Medium Total										9.9E-05	i				2.3
	Air	North Waterfront	Inhalation	cis-1.2-Dichloroethene	0.002	mg/m <sup>3</sup>	1.8E-04	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.0E-03	(mg/m³)	NA	(mg/m³)	
	[ ···			Trichloroethene (Mutagenic)	0.006	mg/m³	2.7E-03	(mg/m³)	1.0E-06	(ug/m <sup>3</sup> )-1	2.7E-06	5.8E-03	(mg/m³)	NA	(mg/m <sup>3</sup> )	-
		1	1	Trichloroethene (Nonmutagenic	0.006	mg/m <sup>3</sup>	5.0E-04	(mg/m³)	3.1E-06	(ug/m <sup>3</sup> )-1	1.6E-06	5.8E-03	(mg/m <sup>3</sup> )	2.0E-03	(mg/m <sup>3</sup> )	2.9
				Vinyl Chloride	7.4E-4	mg/m <sup>3</sup>	8.0E-04	(mg/m³)	4.4E-06	(ug/m³)-1	3.5E-06	7.0E-04	(mg/m³)	1.0E-01	(mg/m <sup>3</sup> )	0.007
				Aluminum	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		0.0E+00	(mg/m³)	5.0E-03	(mg/m <sup>3</sup> )	
		}		Chromium VI	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	B.4E-02	(ug/m³)-1		0.0E+00	(mg/m³)	1.0E-04	(mg/m³)	
		1		iron	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)-1		0.0E+00	(mg/m³)	NA	(mg/m³)	
		1		Manganese	0.0E+0	ma/m³	0.0E+00	(mg/m³)	NA.	(ug/m³)·1		0.0E+00	(mg/m³)	5.0E-05	(mg/m <sup>3</sup> )	
	1		Exp. Route Total	1		Jg	1	1 (*******/			7.7E-06	1				2.9
		Exposure Point Total	1 - 4 - 1 - 1 - 1 - 1	<u> </u>			1				7.7E-06	i —				2.9
	Exposure Medium Total	xposore r orin rotal									7.7E-06		·			2.9
Madica Tat-1	Lyboana Medidiii Tolai			4			1				1.1E-04	<del> </del>		<u> </u>		5.2
Medium Total					·			otal Cancer Risks	tor Curton Call	and Croundwater	1.7E-04	Tota	Hazard Indices to	Surface Soil a	and Groundwater	5.9
							Tota	Cancer Risks for	Subsurface Soll	and Groundwater	1.4E-04	I lotal He	zard Indices for Su	osurrace Soll a	ana Groundwater	6.1

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.9.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 0F 2

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

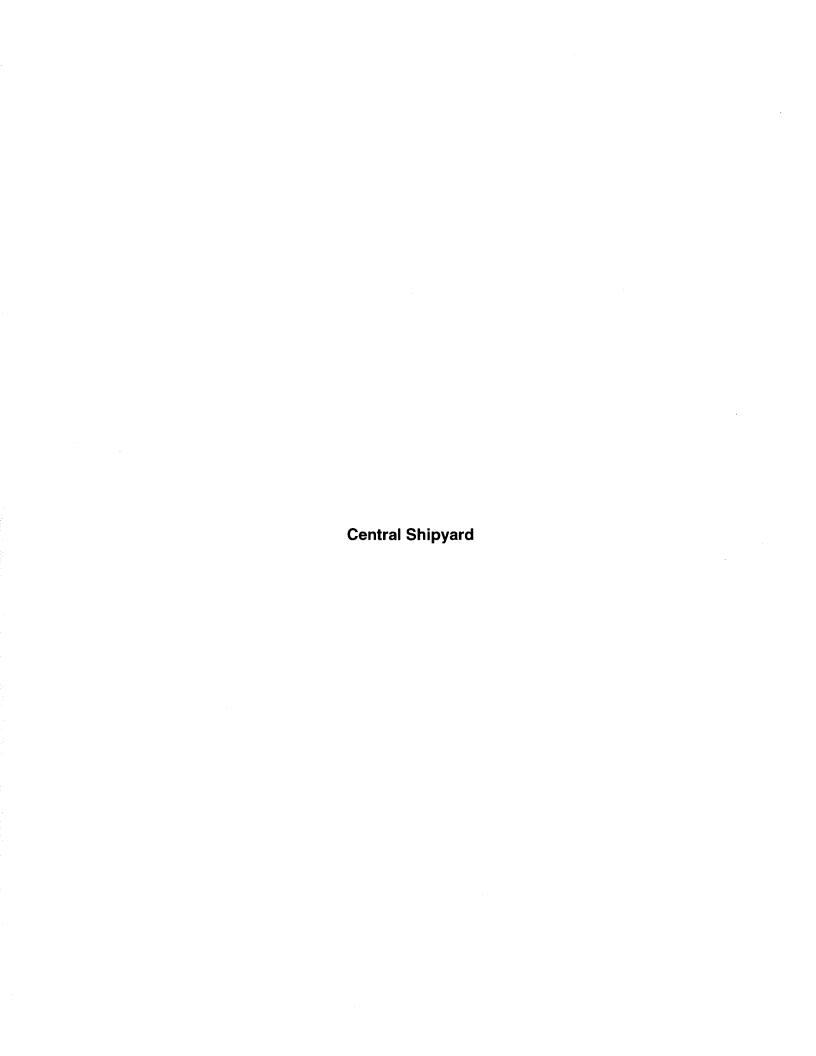
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	tions			Non-Ca	ncer Hazard C	alculations	
			ľ	Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/I	Jnit Risk	Cancer Risk		re Concentration		D/RfC	Hazard Quotien
							Value	Units	Value	Units		Value	Units	Value	Units	<u> </u>
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.207	mg/kg	1.8E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.3E-07	2.8E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.161	mg/kg	1.4E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.0E-06	2.2E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.251	mg/kg	2.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.6E-07	3.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.209	mg/kg	1.8E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.3E-09	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.124	mg/kg	1.1E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	7.8E-07	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	9.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6.9E-08	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
			1	Chromium VI	13.5	mg/kg	1.2E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	5.8E-06	1.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006
			1	Cobalt	7.90	mg/kg	3.7E-06	(mg/kg/day)	NA	(mg/kg/day) '		1.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04
			L	Iron	17,425	mg/kg	8.2E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.03
			Exp. Route Total								8.0E-06	t				0.08
			Dermal	Benzo(a)anthracene	0.207	mg/kg	9.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) 1	6.7E-08	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
	l			Benzo(a)pyrene	0.161	mg/kg	7.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	5.2E-07	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
	[			Benzo(b)fluoranthene	0.251	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	8.2E-08	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	
	(			Chrysene	0.209	mg/kg	9.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	6.8E-10	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
	i			Dibenzo(a,h)anthracene	0.124	mg/kg	5.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>.1</sup>	4.0E-07	8.8E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	4.9E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.6E-08	7.7E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Chromium VI	13.5	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	7.90	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Irón	17,425	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total	L							1.1E-06					
		Exposure Point Total									9.1E-06					0.08
	Exposure Medium Total										9.1E-06					0.08
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.9E-11	mg/m <sup>3</sup>	1.1E-11	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.2E-12	1.8E-11	(mg/m³)	NA	(mg/m³)	
			1	Benzo(a)pyrene	1.5E-11	mg/m <sup>3</sup>	8.8E-12	(mg/m <sup>3</sup> )	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	9.7E-12	1.4E-11	(mg/m³)	NA	(mg/m <sup>3</sup> )	
				Benzo(b)fluoranthene	2.3E-11	mg/m <sup>3</sup>	1.4E-11	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	1.5E-12	2.2E-11	(mg/m³)	NA	(mg/m³)	
				Chrysene	1.9E-11	mg/m <sup>3</sup>	1.1E-11	(mg/m³)	1.1E-05	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.3E-13	1.8E-11	(mg/m³)	NA	(mg/m³)	
				Dibenzo(a,h)anthracene	1,1E-11	mg/m³	6.8E-12	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	8.2E-12	1.1E-11	(mg/m³)	NA	(mg/m³)	1
				Indeno(1,2,3-cd)pyrene	9.9E-12	mg/m³	6.0E-12	(mg/m³)	1.1E-04	(ug/m³)-1	6.6E-13	9.5E-12	(mg/m³)	NA	(mg/m³)	
				Chromium VI	1.2E-9	mg/m <sup>3</sup>	7.4E-10	(mg/m <sup>3</sup> )	8.4E-02	(ug/m³) <sup>-1</sup>	6.2E-08	1.2E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00001
	ļ			Cobalt	7.2E-10	mg/m³	2.4E-10	(mg/m <sup>3</sup> )	9.0E-03	(ug/m³) <sup>-1</sup>	2.1E-09	6.9E-10	(mg/m³)	6.0E-06	(mg/m <sup>3</sup> )	0.0001
				fron	1.6E-6	mg/m³	5.2E-07	(mg/m <sup>3</sup> )	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.5E-06	(mg/m³)	NA	(mg/m³)	
	į		Exp. Route Total								6.4E-08					0.0001
		Exposure Point Total									6.4E-08					0.0001
	Exposure Medium Total										6.4E-08					0.0001
Medium Total											9.1E-06					0.08
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Benzo(a)pyrene	0.044	mg/kg	3.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	2.8E-07	6.0E-08	(mg/kg/day)	NA	(mg/kg/day)	
Sobsuriace con	Dabouriuse son	Troitin Francisco	//igodian	Dibenzo(a,h)anthracene	0.023	mg/kg	2.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.5E-07	3.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	Aluminum	7,510	mg/kg	3.5E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
	}			Chromium VI	11.0	mg/kg	9.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)-1	4.7E-06	1.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
	1			Cobalt	8.68	mg/kg	4.1E-06	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		1.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04
	ł			Iron	20.100	mg/kg	9.4E-03	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		2.8E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
			Exp. Route Total	1	20,100	1 1 9 1 9		(///g///g//////		(inging/day)	5.2E-06		1 (39)/		1 (33)	0.09
			Dermal	Benzo(a)pyrene	0.044	mg/kg	2.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.4E-07	3.1E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
			Demai	Dibenzo(a,h)anthracene	0.023	mg/kg	1.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	7.6E-08	1.7E-08	(mg/kg/day)	NA.	(mg/kg/day)	
				Aluminum	7.510	ma/ka	0.0E+00	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	7.65.06	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			1	Chromium VI	11.0	mg/kg mg/kg	0.0E+00 0.0E+00	(mg/kg/day) (mg/kg/day)	2.0E+01	(mg/kg/day)		0.0E+00	(mg/kg/day) (mg/kg/day)	7.5E-05	(mg/kg/day) (mg/kg/day)	1
				Cobalt	8.68	mg/kg mg/kg	0.0E+00	(mg/kg/day) (mg/kg/day)	NA NA			0.0E+00	(mg/kg/day)	7.5E-05 3.0E-04	(mg/kg/day)	1 -
			1	1	20,100		0.0E+00		NA NA	(mg/kg/day) <sup>-1</sup>	I ::	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	1
			Con Davida Total	Iron	20,100	mg/kg	U.UE+UU	(mg/kg/day)	I. INA	(mg/kg/day) <sup>-1</sup>	2.2E-07	0.05+00	(mg/kg/day)	7.02-01	1 (mg/kg/day)	<del></del>
	)		Exp. Route Total								5.4E-06	<del> </del>				0.09
		Exposure Point Total														
	Exposure Medium Total						11				5.4E-06	II				0.09

### TABLE 7.9. RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	i	Car	ncer Risk Calcula	tions			Non-Ca	ncer Hazard C	alculations	
	ļ			Potential Concern	Value	Units		e Concentration	CSF/L	Init Risk	Cancer Risk		re Concentration		D/RfC	Hazard Quotie
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Air	North Waterfront	Inhalation	Benzo(a)pyrene	4.0E-12	mg/m <sup>3</sup>	2.4E-12	(mg/m <sup>3</sup> )	1.1E-03	(ug/m <sup>3</sup> )-1	2.7E-12	3.8E-12	(mg/m <sup>3</sup> )	NA	(mg/m³)	
				Dibenzo(a,h)anthracene	2.1E-12	mg/m³	1.3E-12	(mg/m <sup>3</sup> )	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.5E-12	2.0E-12	(mg/m <sup>3</sup> )	NA	(mg/m <sup>3</sup> )	
				Aluminum	6.8E-7	mg/m³	2.2E-07	(mg/m³)	NA	(ug/m³)-1		6.5E-07	(mg/m <sup>3</sup> )	5.0E-03	(mg/m³)	0.0001
				Chromium VI	1.0E-9	mg/m³	6.0E-10	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> )-1	5.1E-08	9.6E-10	(mg/m³)	1.0E-04	(mg/m <sup>3</sup> )	0.000010
			ł	Cobalt	7.9E-10	mg/m³	2.6E-10	(mg/m³)	9.0E-03	(ug/m³)·1	2.3E-09	7.6E-10	(mg/m <sup>3</sup> )	6.0E-06	(mg/m <sup>3</sup> )	0.0001
				Iron	1.8E-6	mg/m³	6.0E-07	(mg/m³)	NA.	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.8E-06	(mg/m³)	NA	(mg/m³)	
			Exp. Route Total	1		1		(		(-9)	5.3E-08		, , <i>y</i> ,		1 (	0.0003
		Exposure Point Total			•						5.3E-08					0.0003
	Exposure Medium Total	Exposure i dinit rotal					ł				5.3E-08					0.0003
Medium Total	Exposure Medium Total											<del></del>				0.0003
			T			<del>,</del>				,	5.4E-06					
Groundwater	Groundwater	North Waterfront	Ingestion	cis-1,2-Dichloroethene	4.26	ug/L	4.0E-05	(mg/kg/day)	NA	(mg/kg/day)		1.2E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.06
				Trichloroethene (Mutagenic)	12.2	ug/L	2.1E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)	2.0E-06	3.3E-04	(mg/kg/day)	NA	(mg/kg/day)	
				Trichloroethene (Nonmutagenic	12.2	ug/L	1.1E-04	(mg/kg/day)	3.7E-02	(mg/kg/day)	4.2E-06	3.3E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.7
	ļ.			Vinyl Chloride	1.47	ug/L	1.4E-05	(mg/kg/day)	7.2E-01	(mg/kg/day)	9.9E-06	4.0E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01
				Aluminum	337	ug/L	3.2E-03	(mg/kg/day)	NA NA	(mg/kg/day)		9.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.009
			1	Chromium VI	0.508	ug/L	8.7E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)	4.4E-06	1.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
				Iron	605	ug/L	5.7E-03	(mg/kg/day)	NA NA	(mg/kg/day)		1.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.02
				Manganese	53.9	ug/L	5.1E-04	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.5E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.06
			Exp. Route Total	<u> </u>							2.0E-05	<u> </u>				0.8
			Dermal	cls-1,2-Dichloroethene	4.26	ug/L	5.0E-06	(mg/kg/day)	NA	(mg/kg/day)"		1.5E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.007
				Trichloroethene (Mutagenic)	12.2	ug/L	3.5E-05	(mg/kg/day)	9.3E-03	(mg/kg/day) <sup>-1</sup>	3.3E-07	5.6E-05	(mg/kg/day)	NA	(mg/kg/day)	
				Trichloroethene (Nonmutagenic	12.2	ug/L	1.9E-05	(mg/kg/day)	3.7E-02	(mg/kg/day) <sup>-1</sup>	7.1E-07	5.6E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.1
				Vinyl Chloride	1.47	ug/L	7.3E-07	(mg/kg/day)	7.2E-01	(mg/kg/day) <sup>-1</sup>	5.3E-07	2.1E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0007
				Aluminum	337	ug/L	1.7E-05	(mg/kg/day)	NA	(mg/kg/day) 1		4.8E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00005
				Chromium VI	0.508	ug/L	9.1E-08	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>	1.8E-06	1.5E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.002
				Iron	605	ug/L	3.0E-05	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		8.7E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0001
				Manganese	53.9	ug/L	2.6E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		7.7E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.008
			Exp. Route Total	1			1				3.4E-06					0.1
		Exposure Point Total									2.4E-05					1.0
	Exposure Medium Total	<del></del>							•		2.4E-05					1.0
	Air	North Waterfront	Inhalation	cis-1,2-Dichloroethene	0.002	mg/m <sup>3</sup>	7.0E-04	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.0E-03	(mg/m³)	NA	(mg/m³)	
	[""		alation	Trichloroethene (Mutagenic)	0.006	mg/m <sup>3</sup>	3.7E-03	(mg/m³)	1.0E-06	(ug/m³)-1	3.7E-06	5.8E-03	(mg/m³)	NA.	(mg/m <sup>3</sup> )	1
			1	Trichloroethene (Nonmutagenic)	0.006	mg/m³	2.0E-03	(mg/m³)	3.1E-06	(ug/m <sup>3</sup> )-1	6.2E-06	5.8E-03	(mg/m³)	2.0E-03	(mg/m <sup>3</sup> )	2.9
	1			Vinyl Chloride	7.4E-4	mg/m <sup>3</sup>	2.4E-04	(mg/m³)	4.4E-06	(ug/m³)-1	1.1E-06	7.0E-04	(mg/m³)	1.0E-01	(mg/m³)	0.007
	1	[		Aluminum	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA NA	(ug/m³)-1	1.12-00	0.0E+00	(mg/m³)	5.0E-03	(mg/m³)	
		1		Chromium VI	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.0E+00	(mg/m³)	1.0E-04	(mg/m³)	I
		1		Iron	0.0E+0	mg/m³	0.0E+00	(mg/m <sup>3</sup> )	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.0E+00	(mg/m³)	NA	(mg/m³)	
				Menganese	0.0E+0	mg/m³	0.0E+00	(mg/m²)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.0E+00	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	1
			Exp. Route Total	Winingallese	U.UE+U	mg/m*	( U.UE+00	(mg/m)	I INV	I (ug/m)	1.1E-05	1-0.00.+00	(mg/m)	3.00-03	(mg/m²)	2.9
		F 5 115 11	Exp. Houte Total	ــــــــــــــــــــــــــــــــــــــ			<del></del>					<del></del>			<del></del>	
	ļ <u>.</u>	Exposure Point Total					<b></b>				1.1E-05					2.9
	Exposure Medium Total						<u> </u>				1.1E-05					2.9
Medium Total										<u> </u>	3.5E-05					3.9
							Т	otal Cancer Risks	for Surface Soil	and Groundwater	4.4E-05	Tota	l Hazard Indices fo	r Surface Soil a	and Groundwater	4.0
· ·							Total	Cancer Risks for	Subsurface Soil	and Groundwater	4.0E-05	Total Ha	zard Indices for Su	heurlana Soll a	and Groundweter	4.0

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



### LIST OF TABLES RAGS PART D TABLE 7 - CENTRAL SHIPYARD CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.	
	Reasonable Maximum Exposures
7.1.RME	Current Adolescent Trespassers - Central Shipyard
7.2.RME	Current Adult Trespassers - Central Shipyard
7.3.RME	Current Industrial Workers - Central Shipyard
7.4.RME	Future Adolescent Trespassers - Central Shipyard
7.5.RME	Future Adult Trespassers - Central Shipyard
7.6.RME	Future Industrial Workers - Central Shipyard
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - Central Shipyard
7.9.RME	Hypothetical Adult Residents - Central Shipyard

### TABLE 7.1 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC .	,	Car	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	
			İ	Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/I	Jnit Risk	Cancer Risk	Intake/Exposur	e Concentration	Rf	D/RfC	Hazard Quotien
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Cecntral Shipyard	Ingestion	Arsenic	24.4	mg/kg	9.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.4E-06	6.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Chromium VI	15.8	mg/kg	1.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	8.9E-07	4.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001
				Cobalt	14.7	mg/kg	5.5E-07	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		3.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Iron	31,800	mg/kg	1.2E-03	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		8.4E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
		1		Manganese	448	mg/kg	1.7E-05	(mg/kg/day)	NA.	(mg/kg/day) 1		1.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005
			Exp. Route Total								2.3E-06					0.05
			Dermail	Arsenic	24.4	mg/kg	6.1E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	9.1E-07	4.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
	1			Chromium VI	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
	}			Cobalt	14.7	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	31,800	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	1
		l		Manganese	448	mg/kg	0.0E+00	(mg/kg/day)	NA _	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total							· · · · · · · · · · · · · · · · · · ·	9.1E-07					0.01
		Exposure Point Total									3.2E-06					0.07
	Exposure Medium Total										3.2E-06					0.07
	Air	Cecntral Shipyard	Inhalation	Arsenic	2.2E-9	mg/m <sup>3</sup>	6.9E-12	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.0E-11	4.9E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003
			İ	Chromium VI	1.4E-9	mg/m <sup>3</sup>	1.3E-11	(mg/m³)	8.4E-02	(ug/m³) <sup>-1</sup>	1.1E-09	3.1E-11	(mg/m³)	1.0E-04	(mg/m³)	3.1E-7
				Cobalt	1.3E-9	mg/m <sup>3</sup>	4.2E-12	(mg/m³)	9.0E-03	(ug/m³)·1	3.8E-11	2.9E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000005
			ŀ	Iron	2.9E-6	mg/m <sup>3</sup>	9.1E-09	(mg/m³)	NA	(ug/m³) <sup>-1</sup>	•	6.3E-08	(mg/m³)	NA	(mg/m³)	
	İ			Manganese	4.1E-8	mg/m <sup>3</sup>	1.3E-10	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		8.9E-10	(mg/m³)	5.0E-05	(mg/m <sup>3</sup> )	0.00002
	1		Exp. Floute Total				<u> </u>				1.2E-09					0.00003
		Exposure Point Total									1.2E-09					0.00003
	Exposure Medium Total										1.2E-09					0.00003
Medium Total											3.2E-06					0.07
	<del></del>							Total o	f Receptor Risks	Across All Media	3.2E-06		Total of Rec	eptor Hazards	Across All Media	0.07

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.2.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1.0F 1.

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	T E	PC		Car	cer Risk Calcula	itions			Non-Car	ncer Hazard Ca	alculations	
		· ·	1	Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	HI	D/RfC	Hazard Quotie
				•			Value	Units	Value	Units		Value	Units	Value	Units	
ırface Soil	Surface Soil	Central Shipyard	Ingestion	Arsenic	24.4	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.0E-06	4.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Chromium VI	15.B	mg/kg	8.5E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	4.2E-07	3.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0010
				Cobalt	14.7	mg/kg	7.9E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009
	1			iron	31,800	mg/kg	1.7E-03	(mg/kg/day)	NA	(mg/kg/day) 1	•-	6.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.009
	1			Manganese	448	mg/kg	2.4E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		8.4E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.004
			Exp. Route Total								2.4E-06					0.04
			Dermal	Arsenic	24.4	mg/kg	1.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.4E-07	5.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
				Chromium Vt	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
		}		Cobalt	14.7	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	31,800	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	448	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1	- *	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total								2.4E-07	<u> </u>				0.002
		Exposure Point Total		-							2.6E-06	<u> </u>				0.04
	Exposure Medium Total										2.6E-06					0.04
	Air	Central Shipyard	Inhalation	Arsenic	2.2E-9	mg/m <sup>3</sup>	1.4E-11	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.0E-11	4.9E-11	(mg/m <sup>3</sup> )	1.5E-05	(mg/m³)	0.000003
				Chromium VI	1.4E-9	mg/m³	9.0E-12	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	7.6E-10	3.1E-11	(mg/m³)	1.0E-04	(mg/m³)	3.1E-7
		1	Ì	Cobalt	1.3E-9	rng/m <sup>3</sup>	8.4E-12	(mg/m³)	9.0E-03	(ug/m³)-1	7.5E-11	2.9E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000005
				Iron	2.9E-6	mg/m <sup>3</sup>	1.8E-08	(mg/m <sup>3</sup> )	NA	(ug/m³)-1		6.3E-08	(mg/m³)	NA	(mg/m³)	
				Manganese	4.1E-8	mg/m³	2.6E-10	(mg/m³)	NA	(ug/m³) <sup>-1</sup>	<u> </u>	8.9E-10	(mg/m³)	5.0E-05	(mg/m³)	0.00002
			Exp. Route Total								8.9E-10					0.00003
		Exposure Point Total									8.9E-10					0.00003
	Exposure Medium Total										8.9E-10					0.00003
Medium Total											2.6E-06	L				0.04
	<del></del>							Total of	Receptor Risks	Across All Media	2.6E-06		Total of Rec	eptor Hazards.	Across All Media	0.04

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.3 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	ations		1	Non-Ca	ncer Hazard C	alculations	
	•			Potential Concern	Value	Units	Intake/Exposul	e Concentration	CSF/I	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	1
urlace Soil	Surface Soil	Central Shipyard	Ingestion	Arsenic	24.4	mg/kg	8.5E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) 1	1.3E-05	2.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
			1	Chromium VI	15.8	mg/kg	5.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)	2.8E-06	1.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
				Cobalt	14.7	mg/kg	5.1E-06	(mg/kg/day)	NA	(mg/kg/day) 1		1.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.05
				Iron	31,800	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day)-1		3.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
				Manganese	448	mg/kg	1.6E-04	(mg/kg/day)	NA.	(mg/kg/day)		4.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
			Exp. Route Total								1.6E-05	]			_	0.2
			Dermal	Arsenic	24.4	mg/kg	1.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.5E-06	4.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
			1	Chromium VI	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	14.7	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	31,800	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
		ì		Manganese	448	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	<u></u>
			Exp. Route Total								2.5E-06					0.02
	L	Exposure Point Total									1.8E-05					0.2
	Exposure Medium Total										1.8E-05					0.2
	Air	Central Shipyard	Inhalation	Arsenic	2.2E-9	mg/m³	1.8E-10	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	7.8E-10	5.1E-10	(mg/m³)	1.5E-05	(mg/m³)	0.00003
	į			Chromium VI	1.4E-9	mg/m³	1.2E-10	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	9.8E-09	3.3E-10	(mg/m <sup>3</sup> )	1.0E-04	(mg/m <sup>3</sup> )	0.000003
	1	ł		Cobalt	1.3E-9	mg/m³	1.1E-10	(mg/m <sup>3</sup> )	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	9.8E-10	3.1E-10	(mg/m³)	6.0E-06	(mg/m³)	0.00005
	1			Iron	2.9E-6	mg/m <sup>3</sup>	2.4E-07	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		6.6E-07	(mg/m³)	NA.	(mg/m <sup>3</sup> )	
	ĺ			Manganese	4.1E-8	mg/m <sup>3</sup>	3.3E-09	(mg/m <sup>3</sup> )	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		9.3E-09	(mg/m³)	5.0E-05	(mg/m <sup>3</sup> )	0.0002
	ì		Exp. Route Total								1.2E-08	L				0.0003
		Exposure Point Total									1.2E-08					0.0003
	Exposure Medium Total										1.2E-08					0.0003
Medium Total											1.8E-05					0.2
								Total o	Receptor Risks	Across All Media	1.8E-05	Ï ·	Total of Rec	eptor Hazards	Across All Media	0.2

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.4.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	itions			Non-Ca	incer Hazard C	alculations	
			ľ	Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	e Concentration	Af	D/RfC	Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	l
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.300	mg/kg	3.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.5E-08	7.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
	1		1	Benzo(a)pyrene	0.140	mg/kg	1.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.2E-07	3.7E-08	(mg/kg/day)	NA.	(mg/kg/day)	
				Benzo(b)fluoranthene	0.340	mg/kg	3.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) 1	2.8E-08	8.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.300	mg/kg	3.4E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	2.5E-10	7.9E-08	(mg/kg/day)	NA NA	(mg/kg/dey)	
				Arsenic	23.7	mg/kg	8.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.3E-06	6.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
			l .	Chromium VI	17.3	mg/kg	2.0E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	9.8E-07	4.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
				Cobalt	14.6	mg/kg	5.5E-07	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Iron	32,500	mg/kg	1.2E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		8.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
				Manganese	435	mg/kg	1.6E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.1E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005
1	}		Exp. Route Total								2.5E-06					0.05
	1		Dermal	Benzo(a)anthracene	0.300	mg/kg	9.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	7.1E-08	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	
	1			Benzo(a)pyrene	0.140	mg/kg	4.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.3E-07	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.340	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	8.0E-08	2.6E-07	(mg/kg/day)	, NA	(mg/kg/day)	
į				Chrysene	0.300	mg/kg	9.7E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	7.1E-10	2.3E-07	(mg/kg/day)	. NA	(mg/kg/day)	1 -
li .	-			Arsenic	23.7	mg/kg	5.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	8.8E-07	4.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
1				Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	-
}				Cobalt	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	-
				Iron	32,500	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	435	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total		-						1.4E-06	<u> </u>				0.01
		Exposure Point Total									3.8E-06					0.07
	Exposure Medium Total			7 10 10 10 10 10 10 10 10 10 10 10 10 10							3.8E-06					0.07
	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m <sup>3</sup>	2.6E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.8E-14	6.0E-13	(mg/m³)	NA.	(mg/m³)	
				Benzo(a)pyrene	1.3E-11	mg/m <sup>3</sup>	1.2E-13	(mg/m³)	1.1E-03	(ug/m³) <sup>-1</sup>	1.3E-13	2.8E-13	(mg/m <sup>3</sup> )	NA	(mg/m³)	
				Benzo(b)fluoranthene	3.1E-11	mg/m <sup>3</sup>	2.9E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	3.2E-14	6.8E-13	(mg/m³)	NA.	(mg/m³)	
				Chrysene	2.7E-11	mg/m <sup>3</sup>	2.6E-13	(mg/m³)	1.1E-05	(ug/m³)-1	2.8E-15	6.0E-13	(mg/m³)	NA	(mg/m³)	
			i	Arsenic	2.2E-9	mg/m <sup>3</sup>	6.7E-12	(mg/m³)	4.3E-03	(ug/m³)-1	2.9E-11	4.7E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003
			1	Chromium VI	1.6E-9	rng/m <sup>3</sup>	1.5E-11	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.2E-09	3.4E-11	(mg/m³)	1.0E-04	(mg/m³)	3.4E-7
				Cobalt	1.3E-9	rng/m³	4.2E-12	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> )-1	3.7E-11	2.9E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000005
Ĭ				Iron	3.0E-6	mg/m³	9.3E-09	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		6.5E-08	(mg/m³)	NA NA	(mg/m³)	
	1	l	1	Manganese	4.0E-B	mg/m <sup>3</sup>	1.2E-10	(mg/m³)	NA NA	(ug/m <sup>3</sup> )-1		8.7E-10	(mg/m³)	5.0E-05	(mg/m³)	0.00002
	1	l	Exp. Route Total								1.3E-09					0.00003
		Exposure Point Total									1.3E-09					0.00003
	Exposure Medium Total										1.3E-09	<u> </u>				0.00003
Medium Total						****					3.8E-06					0.07

### TABLE 7.4.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	ations			Non-Ca	ncer Hazard C	alculations	
	1			Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/\	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfl	D/RfC	Hazard Quotier
				ļ			Value	Units	Value	Units	1	Value	Units	Value	Units	
surface Soil	Subsurface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.278	mg/kg	3.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.3E-08	7.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	Benzo(a)pyrene	0.194	mg/kg	2.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.6E-07	5.1E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	Benzo(b)fluoranthene	0.247	mg/kg	2.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	2.0E-08	6.5E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	Chrysene	0.282	mg/kg	3.2E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	2.3E-10	7.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
			-	Dibenzo(a,h)anthracene	0.046	mg/kg	5.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) 1	3.8E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	2.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.6E-08	5.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Aluminum	10,200	mg/kg	3.8E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.7E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
				Arsenic	18.4	mg/kg	6.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	1.0E-06	4.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Chromium VI	13.3	mg/kg	1.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) 1	7.5E-07	3.5E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001
			ł	Cobalt	12.3	mg/kg	4.6E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
			i	Iron	26,900	mg/kg	1.0E-03	(mg/kg/day)	NA	(mg/kg/day)		7.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
			Exp. Route Total	1							2.0E-06					0.04
			Dermal	Benzo(a)anthracene	0.278	mg/kg	9.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	6.5E-08	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	-
				Benzo(a)pyrene	0.194	mg/kg	6.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)	4.6E-07	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.247	mg/kg	8.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	5.8E-08	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.282	mg/kg	9.1E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	6.6E-10	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.046	mg/kg	1.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.1E-07	3.5E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	6.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.7E-08	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	18.4	mg/kg	4.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	6.BE-07	3.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	-
				Cobatt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total								1.4E-06					0.01
		Exposure Point Total		* <u></u>							3.5E-06					0.05
	Exposure Medium Total						1			-	3.5E-06	<u> </u>				0.05
	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.5E-11	mg/m³	2.4E-13	(mg/m³)	1.1E-04	(ug/m³)-1	2.6E-14	5.5E-13	(mg/m³)	NA	(mg/m³)	
	[ "			Benzo(a)pyrene	1.8E-11	mg/m³	1.7E-13	(mg/m³)	1.1E-03	(ug/m³)-1	1.8E-13	3.9E-13	(mg/m³)	NA	(mg/m <sup>3</sup> )	- 1
			1	Benzo(b)fluoranthene	2.2E-11	mg/m³	2.1E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	2.3E-14	4.9E-13	(mg/m³)	NA	(mg/m <sup>3</sup> )	
	ł		1	Chrysene	2.6E-11	mg/m³	2.4E-13	(mg/m <sup>3</sup> )	1.1E-05	(ug/m³)·1	2.6E-15	5.6E-13	(mg/m³)	NA	(mg/m <sup>3</sup> )	
	į			Dibenzo(a,h)anthracene	4.2E-12	mg/m³	3.9E-14	(mg/m³)	1.2E-03	(ug/m³)-1	4.7E-14	9.2E-14	(mg/m³)	NA	(mg/m³)	
	į			Indeno(1,2,3-cd)pyrene	1.8E-11	mg/m³	1.7E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	1.9E-14	4.0E-13	(mg/m³)	NA	(mg/m³)	
				Aluminum	9.3E-7	mg/m³	2.9E-09	(mg/m <sup>3</sup> )	NA.	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.0E-08	(mg/m <sup>3</sup> )	5.0E-03	(mg/m³)	0.000004
				Arsenic	1.7E-9	mg/m <sup>3</sup>	5.2E-12	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> )-1	2.3E-11	3.7E-11	(mg/m <sup>3</sup> )	1.5E-05	(mg/m³)	0.000002
				Chromium VI	1.2E-9	mg/m <sup>3</sup>	1.1E-11	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> )-1	9.5E-10	2.7E-11	(mg/m³)	1.0E-04	(mg/m³)	2.7E-7
		Į.	1	Cobalt	1.1E-9	mg/m <sup>3</sup>	3.5E-12	(mg/m³)	9.0E-03	(ug/m³)-1	3.2E-11	2.5E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000004
		l	1	Iron	2.4E-6	mg/m³	7.7E-09	(mg/m³)	NA	(ug/m³)·1		5.4E-08	(mg/m³)	NA	(mg/m³)	
	1	!	Exp. Route Total	1	•		Ì	* * *	•		1.0E-09					0.00001
		Exposure Point Total		1							1.0E-09					0.00001
	Exposure Medium Total										1.0E-09					0.00001
Medium Total	Lapossi o incolarii Total						1				3.5E-06	1				0.05
Medicili Lotal											<u> </u>					

Note

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.5. RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	l	Cai	ncer Risk Calcula	tions			Non-Ca	ncer Hazard C	alculations	
		, i		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/L	Init Risk	Cancer Risk	Intake/Exposur	e Concentration	Rf	D/RfC	Hazard Quotient
					1		Value	Units	Value	Units		Value	Units	Value	Units	1
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.2E-08	5.6E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
ŀ		1	Į.	Benzo(a)pyrene	0.140	mg/kg	7.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	5.5E-08	2.6E-08	(mg/kg/day)	NA.	(mg/kg/day)	
			i	Benzo(b)fluoranthene	0.340	mg/kg	1.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.3E-08	6.4E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Chrysene	0.300	mg/kg	1.6E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.2E-10	5.6E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
İ				Arsenic	23.7	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.9E-06	4.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
			1	Chromium VI	17.3	mg/kg	9.3E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)	4.6E-07	3.3E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001
			}	Cobalt	14.6	mg/kg	7.8E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009
		}	1	Iron	32,500	mg/kg	1.7E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		6.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.009
	:	1		Manganese	435	mg/kg	2.3E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		8.2E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003
i		!	Exp. Route Total				i				2.5E-06					0.04
		1	Dermal	Benzo(a)anthracene	0.300	mg/kg	8.4E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6.1E-09	2.9E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
		<b> </b>		Benzo(a)pyrene	0.140	mg/kg	3.9E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	2.8E-08	1.4E-08	(mg/kg/day)	NA NA	(mg/kg/day)	1
	•			Benzo(b)fluoranthene	0.340	mg/kg	9.5E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6.9E-09	3.3E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
		1		Chrysene	0.300	mg/kg	8.4E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	6.1E-11	2.9E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
		i	1	Arsenic	23.7	mg/kg	1.5E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.3E-07	5.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
	ì			Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	-
				Iron	32,500	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	435	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total								2.7E-07					0.002
		Exposure Point Total									2.7E-06					0.04
	Exposure Medium Total										2.7E-06					0.04
	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m <sup>3</sup>	1.7E-13	(mg/m³)	1.1E-04	(ug/m³) <sup>-1</sup>	1.9E-14	6.0E-13	(mg/m³)	NA NA	(mg/m³)	
			1	Benzo(a)pyrene	1.3E-11	mg/m³	8.0E-14	(mg/m³)	1.1E-03	(ug/m³)-1	8.8E-14	2.8E-13	(mg/m³)	NA NA	(mg/m³)	-
		<b>!</b>	1	Benzo(b)fluoranthene	3.1E-11	mg/m³	1.9E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.1E-14	6.8E-13	(mg/m³)	NA NA	(mg/m³)	
i		į	1	Chrysene	2.7E-11	mg/m³	1.7E-13	(mg/m³)	1.1E-05	(ug/m³) <sup>-1</sup>	1.9E-15	6.0E-13	(mg/m³)	NA NA	(mg/m³)	-
		İ	1	Arsenic	2.2E-9	mg/m³	1.3E-11	(mg/m³)	4.3E-03	(ug/m³) <sup>-1</sup>	5.8E-11	4.7E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003
			1	Chromium VI	1.6E-9	mg/m <sup>3</sup>	9.8E-12	(mg/m³)	8.4E-02	(ug/m³) <sup>.1</sup>	8.3E-10	3.4E-11	(mg/m³)	1.0E-04	(mg/m³)	3.4E-7
	ì	I	1	Cobalt	1.3E-9	mg/m³	8.3E-12	(mg/m³)	9.0E-03	(ug/m³) <sup>-1</sup>	7.5E-11	2.9E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000005
	}			Iron	3.0E-6	mg/m <sup>3</sup>	1.9E-08	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		6.5E-08	(mg/m³)	NA.	(mg/m³)	-
			L	Manganese	4.0E-8	mg/m <sup>3</sup>	2.5E-10	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		8.7E-10	(mg/m³)	5.0E-05	(mg/m³)	0.00002
			Exp. Route Total								9.6E-10					0.00003
		Exposure Point Total									9.6E-10					0.00003
	Exposure Medium Total										9.6E-10					0.00003
Medium Total							1				2.7E-06					0.04

### TABLE 7.5.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	.PC		Car	cer Risk Calcula	tions			Non-Ca	incer Hazard C	alculations	
			i	Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/U	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RIC	Hazard Quotie
							Value	Units	eulaV	Units		Value	Units	Value	Units	
ubsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.278	mg/kg	1.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.1E-08	5.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.194	mg/kg	1.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	7.6E-08	3.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
	1			Benzo(b)fluoranthene	0.247	mg/kg	1.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	9.7E-09	4.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
	<b>!</b>			Chrysene	0.282	mg/kg	1.5E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.1E-10	5.3E-08	(mg/kg/day)	NA.	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.046	mg/kg	2.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.8E-08	8.6E-09	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	1.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	7.8E-09	3.8E-08	(mg/kg/day)	NA.	(mg/kg/day)	
				Aluminum	10,200	mg/kg	5.5E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.9E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
			i	Arsenic	18.4	mg/kg	9.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.5E-06	3.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	13.3	mg/kg	7.1E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	3.6E-07	2.5E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0008
				Cobalt	12.3	mg/kg	6.6E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.008
				Iron	26,900	mg/kg	1.4E-03	(mg/kg/day)	NA .	(mg/kg/day)-1		5.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.007
			Exp. Route Total		•						2.0E-06	(				0.03
		ł	Dermai	Benzo(a)anthracene	0.278	mg/kg	7.7E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	5.7E-09	2.7E-08	(mg/kg/day)	NA	(mg/kg/day)	
	ì			Benzo(a)pyrene	0.194	mg/kg	5.4E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.9E-08	1.9E-08	(mg/kg/day)	NA.	(mg/kg/day)	
	ì	Į.	1	Benzo(b)fluoranthene	0.247	mg/kg	6.9E-09	(mg/kg/day)	7.3E-01	(mg/kg/day)	5.0E-09	2.4E-08	(mg/kg/day)	NA.	(mg/kg/day)	
	į .		ļ	Chrysene	0.282	mg/kg	7.9E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	5.7E-11	2.7E-08	(mg/kg/day)	NA.	(mg/kg/day)	
	(		i	Dibenzo(a,h)anthracene	0.046	mg/kg	1.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	9.3E-09	4.5E-09	(mg/kg/day)	NA	(mg/kg/day)	
	i			Indeno(1,2,3-cd)pyrene	0.200	mg/kg	5.6E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.1E-09	1.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	18.4	mg/kg	1.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	1.8E-07	4.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001
				Chromium VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobatt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total	1						•	2.4E-07					0.001
		Exposure Point Total		1							2.2E-06					0.03
	Exposure Medium Total	L -1					1				2.2E-06					0.03
	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.5E-11	mg/m³	1.6E-13	(mg/m³)	1,1E-04	(ug/m³) <sup>-1</sup>	1.7E-14	5.5E-13	(mg/m³)	NA.	(mg/m³)	
	ľ.""	- Communication pyane	I maiation	Benzo(a)pyrene	1.8E-11	mg/m <sup>3</sup>	1.1E-13	(mg/m³)	1.1E-03	(ug/m³)-1	1.2E-13	3.9E-13	(mg/m³)	NA.	(mg/m³)	
				Benzo(b)fluoranthene	2.2E-11	mg/m <sup>3</sup>	1.4E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )·1	1.5E-14	4.9E-13	(mg/m³)	NA	(mg/m³)	
				Chrysene	2.6E-11	rng/m <sup>3</sup>	1.6E-13	(mg/m³)	1.1E-05	(ug/m <sup>3</sup> )-1	1.8E-15	5.6E-13	(mg/m³)	NA.	(mg/m³)	
			1	Dibenzo(a,h)anthracene	4.2E-12	mg/m³	2.6E-14	(mg/m³)	1.2E-03	(ug/m³)-1	3.1E-14	9.2E-14	(mg/m³)	NA	(mg/m³)	
		j	1	Indeno(1,2,3-cd)pyrene	1.8E-11	mg/m³	1.1E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	1.3E-14	4.0E-13	(mg/m³)	NA.	(mg/m³)	1
				Aluminum	9.3E-7	mg/m <sup>3</sup>	5.8E-09	(mg/m³)	NA.	(ug/m³)·1		2.0E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000004
	1			Arsenic	1.7E-9	mg/m <sup>3</sup>	1.0E-11	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> )·1	4.5E-11	3.7E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000002
		Ì		Chromium VI	1.2E-9	mg/m <sup>3</sup>	7.6E-12	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> )-1	6.4E-10	2.7E-11	(mg/m³)	1.0E-04	(mg/m³)	2.7E-7
				Cobalt	1.1E-9	mg/m <sup>3</sup>	7.0E-12	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.3E-11	2.5E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000004
		1		Iron	2.4E-6	mg/m <sup>3</sup>	1.5E-08	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>	0.52 //	5.4E-08	(mg/m³)	NA NA	(mg/m³)	
		l	Exp. Route Total	1000	2.70	1 119/111	1.52.55	(mg/m)	14/5	(ug/iii)	7.4E-10	1	(mg/m/)	1 101	1 (1119/1117)	0.00001
		Francis Brist 7 1 1	Exp. noute Total	l							7.4E-10	<del> </del>				0.00001
		Exposure Point Total					ļ					ļ <del></del>				
	Exposure Medium Total						I				7.4E-10	li .				0.00001

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guldance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.6.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Future	
Receptor Population: Industrial	Workers
Receptor Age: Adult	
Medium	Exposure Medium

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	
			- '	Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
							Value	Units	Value	Units	l	Value	Units	Value	Units	l
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	7.7E-08	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	
			1	Benzo(a)pyrene	0.140	mg/kg	4.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.6E-07	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.340	mg/kg	1.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	8.7E-08	3.3E-07	(mg/kg/day)	NA	(mg/kg/day)	
		İ	ļ	Chrysene	0.300	mg/kg	1.0E-07	(mg/kg/day)	7.3E-03	(mg/kg/day)	7.7E-10	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	
	1			Arsenic	23.7	mg/kg	8.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.2E-05	2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
				Chromium VI	17.3	mg/kg	6.0E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	3.0E-06	1.7E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	Q.000B
				Cobalt	14.6	mg/kg	5.1E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
				Iron	32,500	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.2E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.05
			ì	Manganese	435	mg/kg	1.5E-04	(mg/kg/day)	NA.	(mg/kg/day) 1		4.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
			Exp. Route Total	1						* * * * * * * * * * * * * * * * * * * *	1.6E-05		•		-	0.1
			Dermat	Benzo(a)anthracene	0.300	mg/kg	9.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6.6E-08	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
i				Benzo(a)pyrene	0.140	mg/kg	4.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) 1	3.1E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.340	mg/kg	1.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)	7.4E-08	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	
		1		Chrysene	0.300	mg/kg	9.0E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	6.6E-10	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
	j			Arsenic	23.7	mg/kg	1.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	2.5E-06	4.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
	į.			Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	
		i		Cobalt	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	
	į			Iron	32,500	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
•	1			Manganese	435	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
	}		Exp. Route Total	Triungunose	1 700	1 1119/119	1-0.02733	(/iig/iig/duly)	1	(uidudagan)	2.9E-06	1	1 122))		1	0.02
,	1	Company Delet Tetal	Exp. Houte Total	<u> </u>			<del></del>				1.9E-05	1				0.2
ŀ	14 11 2 11	Exposure Point Total			··· · <u></u>		ļ		<u>-</u>		1.9E-05	<b>!</b>				0.2
1	Exposure Medium Total	01-101	I toto et est est	In/->	1 0.75 tt	T3	0.05.10	(3)	1 115 04	1,,,,,,,,3,-1	2.4E-13	6.2E-12	(mg/m³)	NA	(mg/m³)	, v.e.
1	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	2.2E-12	(mg/m³)	1.1E-04	(ug/m³)-1		6.2E-12 2.9E-12	, , ,	NA NA	1 * * .	
				Benzo(a)pyrene	1.3E-11	mg/m <sup>3</sup>	1.0E-12	(mg/m³)	1.1E-03	(ug/m³)·1	1.1E-12 2.8E-13	7.1E-12	(mg/m³)	NA NA	(mg/m³)	"
				Benzo(b)fluoranthene	3.1E-11	mg/m³	2.5E-12	(mg/m³)	1.1E-04	(ug/m³)-1	2.8E-13 2.4E-14	7.1E-12 6.2E-12	(mg/m³)	NA NA	(mg/m³)	"
			1	Chrysene	2.7E-11	mg/m³	2.2E-12	(mg/m³)	1.1E-05	(ug/m³)-1	7.6E-10	6.2E-12 4.9F-10	(mg/m³)	1.5E-05	(mg/m³)	0.00003
				Arsenic	2.2E-9	mg/m <sup>3</sup>	1.8E-10	(mg/m³)	4.3E-03	(ug/m³)-1	1.1E-08	4.9E-10 3.6E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000004
K				Chromium VI	1.6E-9	mg/m <sup>3</sup>	1.3E-10	(mg/m³)	8.4E-02	(ug/m³) <sup>-1</sup>	9.7E-10	3.6E-10 3.0E-10	(mg/m³)	1.0E-04 2.0E-05	(mg/m³)	0.000004
1				Cobalt	1.3E-9	mg/m <sup>3</sup>	1.1E-10	(mg/m³)	9.0E-03	(ug/m³)-1	9.7E-10	6.7E-07	/ (mg/m³)	2.0E-05 NA	(mg/m³)	0.00002
				Iron	3.0E-6	mg/m³	2.4E-07	(mg/m³)	NA 	(ug/m³)-1			(mg/m³)		(mg/m³)	0.0002
Į.		i		Manganese	4.0E-8	mg/m <sup>3</sup>	3.2E-09	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		9.0E-09	(mg/m³)	5.0E-05	(mg/m³)	
			Exp. Route Total	<u> </u>			<u> </u>				1.3E-08					0.0002
l .		Exposure Point Total					<u></u>				1.3E-08	<u> </u>				0.0002
	Exposure Medium Total										1.3E-08					0.0002
Medium Total				111111111111111111111111111111111111111			1				1.9E-05					0.2
Subsurface Soil	Subsurface Soll	Central Shipyard	Ingestion	Benzo(a)anthracene	0.278	mg/kg	9.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	7.1E-08	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	-
				Benzo(a)pyrene	0.194	mg/kg	6.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) '	4.9E-07	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	
		1	1	Benzo(b)fluoranthene	0.247	mg/kg	8.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	6.3E-08	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
			1	Chrysene	0.282	mg/kg	9.9E-08	(mg/kg/day)	7.3E-03	(mg/kg/day)-1	7.2E-10	2.8E-07	(mg/kg/day)	NA	(mg/kg/day)	
			1	Dibenzo(a,h)anthracene	0.046	mg/kg	1.6E-0B	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.2E-07	4.5E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	Indeno(1,2,3-cd)pyrene	0.200	mg/kg	7.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	5.1E-08	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Aluminum	10,200	mg/kg	3.6E-03	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		1.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.010
				Arsenic	18.4	mg/kg	6.4E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	9.6E-06	1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06
		1		Chromium VI	13.3	ma/ka	4.6E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)-1	2.3E-06	1.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0007
				Cobalt	12.3	mg/kg	4.3E-06	(mg/kg/day)	NA.	(mg/kg/day)-1		1.2E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004
	1		1	iron	26,900	mg/kg	9.4E-03	(mg/kg/day)	NA NA	(mg/kg/day)		2.6E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
	ļ	[	Exp. Route Total	1	20,000	myny	J.4E.03	1 (mg/kg/ody)	1	(ing/kg/dily)	1.3E-05	1	(		1 (	0.1
		<u> </u>	Exp. Houle Total				i				1.52.00	4				

### TABLE 7.6.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Industrial Workers

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	<u> </u>	Ca	ncer Risk Calcule	itions			Non-Ca	ncer Hazard C	alculations	
			1 "	Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/	Jnit Risk	Cancer Risk	Intake/Exposur	e Concentration	Rfl	D/RfC	Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Central Shipyard	Dermal	Benzo(a)anthracene	0.278	mg/kg	8.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6.1E-08	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.194	mg/kg	5.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	4.2E-07	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	
		1	ļ	Benzo(b)fluoranthene	0.247	mg/kg	7.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	5.4E-08	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.282	mg/kg	8.5E-08	(mg/kg/day)	7.3E-03	(mg/kg/day)	6.2E-10	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
	1		-	Dibenzo(a,h)anthracene	0.046	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)	1.0E-07	3.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	6.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.4E-08	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)	-
		!		Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	18.4	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) 1	1.9E-06	3.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	
			ŀ	Cobalt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	
			1	Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total								2.6E-06	l				0.01
		Exposure Point Total	"	,			1				1.5E-05					0.1
	Exposure Medium Total	4									1.5E-05					0.1
	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.5E-11	mg/m <sup>3</sup>	2.1E-12	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.3E-13	5.8E-12	(mg/m <sup>3</sup> )	NA NA	(mg/m³)	i
		· · ·		Benzo(a)pyrene	1.8E-11	mg/m³	1.4E-12	(mg/m³)	1.1E-03	(ug/m³) <sup>-1</sup>	1.6E-12	4.0E-12	(mg/m³)	NA	(mg/m³)	
				Benzo(b)fluoranthene	2.2E-11	mg/m³	1.8E-12	(mg/m <sup>3</sup> )	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.0E-13	5.1E-12	(mg/m³)	NA	(mg/m³)	
				Chrysene	2.6E-11	mg/m³	2.1E-12	(mg/m³)	1.1E-05	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.3E-14	5.9E-12	(mg/m³)	NA	(mg/m³)	
				Dibenzo(a,h)anthracene	4.2E-12	mg/m <sup>3</sup>	3.4E-13	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> )-1	4.1E-13	9.5E-13	(mg/m <sup>3</sup> )	NA	(mg/m³)	
	l l			Indeno(1,2,3-cd)pyrene	1.8E-11	mg/m³	1.5E-12	(mg/m³)	1.1E-04	(ug/m³)-1	1.6E-13	4.2E-12	(mg/m³)	NA	(mg/m <sup>3</sup> )	l
				Aluminum	9.3E-7	mg/m³	7.6E-08	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		2.1E-07	(mg/m <sup>3</sup> )	5.0E-03	(mg/m <sup>3</sup> )	0.00004
				Arsenic	1.7E-9	rng/m <sup>3</sup>	1.4E-10	(mg/m³)	4.3E-03	(ug/m³)-1	5.9E-10	3.8E-10	(mg/m³)	1.5E-05	(mg/m³)	0.00003
				Chromium VI	1.2E-9	mg/m <sup>3</sup>	9.9E-11	(mg/m³)	8.4E-02	(ug/m³)·!	8.3E-09	2.8E-10	(mg/m <sup>3</sup> )	1.0E-04	(mg/m³)	0.000003
	}			Cobalt	1.1E-9	mg/m <sup>3</sup>	9.1E-11	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> )·1	8.2E-10	2.6E-10	(mg/m³)	2.0E-05	(mg/m³)	0.00001
			1	Iron	2.4E-6	mg/m <sup>3</sup>	2.0E-07	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		5.6E-07	(mg/m³)	NA	(mg/m <sup>3</sup> )	
			Exp. Route Total						-		9.7E-09	1				0.00008
	1	Exposure Point Total		<del>1</del>			l				9.7E-09					80000.0
	Exposure Medium Total										9.7E-09					0.00008
Medium Total	2,000,000		<u> </u>				i				1.5E-05					0.1
Groundwater	Groundwater	Central Shipyard	Ingestion	Aluminum	312	ug/L	1.1E-03	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		3.1E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
Citodiawater	Groundwater	Central Simpyara	lingestion	Arsenic	78.1	ug/L	2.7E-04	(mg/kg/day)	1.5E+00	(mg/kg/day)	4.1E-04	7.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.5
				Cadmium	1.5	ug/L	5.3E-06	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		1.5E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.03
		1		Cobalt	24.8	ug/L	8.7E-05	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>	1	2.4E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.08
			t	Iron	65.800	ug/L	2.3E-01	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		6.4E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.9
				Manganese	9,100	ug/L	3.2E-02	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		8.9E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	3.7
			Exp. Route Total	Marigariose	3,100	ugre	0.22.02	(Hig/kg/db)/	1	(Iligray day)	4.1E-04		(mg/kg/day)	2.42.02	(g.k.g-dc.))	7.3
			Dermail	Aluminum	312	ug/l	4.9E-07	(ma/ka/day)	NA.	(malkalda) A-1	4.12-04	1.4E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000001
		1	Dermai	Arsenic	78.1	ug/L ug/L	1.2E-07	(mg/kg/day) (mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>	1.9E-07	3.5E-07	(mg/kg/day) (mg/kg/day)	3.0E-04	(mg/kg/day) (mg/kg/day)	0.000
		1		Cadmium	1.5	ug/L ug/L	1.2E-07 2.4E-09	(mg/kg/day) (mg/kg/day)	1.5E+00 NA	1	1.9E-07	6.8E-09	(mg/kg/day) (mg/kg/day)	2.5E-05	(mg/kg/day) (mg/kg/day)	0.0003
1		1		Cobalt	24.8	ug/L ug/L	1.6E-08	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		4.4E-08	(mg/kg/day) (mg/kg/day)	3.0E-03	(mg/kg/day) (mg/kg/day)	0.0003
i		1		Iron	65.800	ug/L ug/L	1.0E-08	(mg/kg/day) (mg/kg/day)	NA NA	1		2.9E-04	(mg/kg/day) (mg/kg/day)	7.0E-01	(mg/kg/day) (mg/kg/day)	0.0004
		1			9,100	I *	1.4E-05		NA NA	(mg/kg/day)*\		4.0E-05	(mg/kg/day) (mg/kg/day)	9.6E-04	(mg/kg/day) (mg/kg/day)	0.004
ľ		1	F D4- 7-1-1	Manganese	1 9,100	ug/L	1.46-05	(mg/kg/day)	IINA	(mg/kg/day)	1.9E-07	4.0E-03	(mg/kg/day)	9.0E-04	(mg/kg/uay)	0.04
i			Exp. Route Total	<u> </u>			<del> </del>					<b> </b>				
l		Exposure Point Total					<b></b>	<del></del>			4.1E-04	ļ				7.3
	Exposure Medium Total						<b></b>				4.1E-04	<b>!</b>				7.3
Medium Total			4.1E-04							7.3						

Total Cancer Risks for Surface Soil and Subsurface Soil
Total Cancer Risks for Subsurface Soil and Subsurface Soil

4.2E-04

Notes

Total Hazard Indices for Surface Soil and Subsurface Soil

Total Hazard Indices for Ssuburface Soil and Subsurface Soil

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.7.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	Ę.	PČ		Can	cer Risk Calcula	ions		T	Non-Ca	ncer Hazard C	alculations	1
1	· '	,	, '	Potential Concern	Value	Units	Intake/Exposure	e Concentration		nit Risk	Cancer Risk	Intake/Exposur	e Concentration	Rf	D/RfC	Hazard Quotient
			İ	1			Value	Units	Value	Units		Value	Units	Value	Units	1 1
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.300	mg/kg	7.2E-09	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	5.3E-09	5.0E-07	(mg/kg/day)	NA .	(mg/kg/day)	
1				Benzo(a)pyrene	0,140	mg/kg	3.4E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	2.5E-08	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
1	1			Benzo(b)fluoranthene	0.340	mg/kg	8.2E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6.0E-09	5.7E-07	(mg/kg/day)	NA	(mg/kg/day)	l
	1			Chrysene	0.300	mg/kg	7.2E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	5.3E-11	5.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
1				Arsenic	23.7	mg/kg	5.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	8.5E-07	4.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
1				Chromium VI	17.3	mg/kg	4.1E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)	2.1E-07	2.9E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.001
(	1			Cobalt	14.6	mg/kg	3.5E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.008
4				Iron	32.500	mg/kg	7.8E-04	(mg/kg/day)	NA	(mg/kg/day)		5.5E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.08
1				Manganese	435	mg/kg	1.0E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		7.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03
Í			Exp. Route Total	1		1		(33))		(gg.a.))	1.1E-06				1 (13.3 )/	0.3
1			Dermal	Benzo(a)anthracene	0.300	mg/kg	2.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.0E-09	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
1			}	Benzo(a)pyrene	0.140	mg/kg	1.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)	9.6E-09	9.2E-08	(mg/kg/day)	NA	(mg/kg/day)	ł " [
ŀ				Benzo(b)fluoranthene	0.340	mg/kg	3.2E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.3E-09	2.2E-07	(mg/kg/day)	NA.	(mg/kg/day)	
				Chrysene	0.300	mg/kg	2.8E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	2.0E-11	2.0E-07	(mg/kg/day)	NA.	(mg/kg/day)	
				Arsenic	23.7	mg/kg	5.1E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	7.7E-08	3.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	1
4				Coball	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	l 1
1				Iron	32,500	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
1				Manganese	435	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day).1		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total		1			(99))		(mg/ng/day)	9.1E-08				1 (99,1)	0.01
9	}	Exposure Point Total		<u> </u>							1.2E-06					0.3
H	Exposure Medium Total	Expedite Form Form									1.2E-06					0.3
1	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.1E-7	mg/m³	3.6E-10	(mg/m³)	1.1E-04	(ug/m³)·1	4.0E-11	2.5E-08	(mg/m³)	NA NA	(mg/m³)	
l	\frac{1}{2}	Contrat Chipyara	"""undition	Benzo(a)pyrene	1.0E-7	mg/m <sup>3</sup>	1.7E-10	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> )-1	1.9E-10	1.2E-08	(mg/m³)	NA.	(mg/m³)	
i			1	Benzo(b)fluoranthene	2.4E-7	mg/m <sup>3</sup>	4.1E-10	(mg/m³)	1.1E-04	(ug/m³)-1	4.5E-11	2.9E-08	(mg/m³)	NA.	(mg/m³)	l I
			1	Chrysene	2.1E-7	mg/m³	3.6E-10	(mg/m³)	1.1E-05	(ug/m³)-1	4.0E-12	2.5E-08	(mg/m³)	NA.	(mg/m³)	l <b>i</b>
	1		1	Arsenic	1.7E-5	mg/m <sup>3</sup>	2.9E-08	(mg/m³)	4.3E-03	(ug/m³) <sup>-1</sup>	1.2E-07	2.0E-06	(mg/m³)	1.5E-05	(mg/m³)	0.1
			1	Chromium VI	1.2E-5	mg/m <sup>3</sup>	2.1E-08	(mg/m³)	8.4E-02	(ug/m³)-1	1.8E-06	1.5E-06	(mg/m³)	1.0E-04	(mg/m³)	0.01
I.			1	Cobalt	1.0E-5	mg/m <sup>3</sup>	1.8E-08	(mg/m³)	9.0E-03	(ug/m³)-1	1.6E-07	1.2E-06	(mg/m³)	2.0E-05	(mg/m³)	0.06
li .	ļ		1	Iron	0.023	mg/m <sup>3</sup>	3.9E-05	(mg/m³)	NA	(ug/m³)-1		2.8E-03	(mg/m³)	NA	(mg/m³)	
1			1	Manganese	3.1E-4	mg/m³	5.3E-07	(mg/m³)	NA	(ug/m³) 1		3.7E-05	(mg/m³)	5.0E-05	(mg/m³)	0.7
1			Exp. Route Total	1				(···•		\- <del>-</del> /	2.0E-06	i	()		, , , , , ,	0.9
1		Exposure Point Total	and the second			***					2.0E-06					0.9
1	Exposure Medium Total	Exposure Forte Fortal									2.0E-06					0.9
Medium Total	Exposure Medium Total			<del></del>							3.2E-06					1.2
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.278		6.7E-09	(mg/kg/day)	7.3E-01	L town then taken At 1	4.9E-09	4.7E-07	(mg/kg/day)	NA .	(mg/kg/day)	1.2
Subsuriace Soil	Subsurface Soil	Central Shipyard	ingestion	Benzo(a)pyrene	0.194	mg/kg mg/kg	4.7E-09	(mg/kg/day) (mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>	4.9E-09 3.4E-08	3.3E-07	(mg/kg/day)	NA NA	(mg/kg/day) (mg/kg/day)	
i			1	Benzo(b)fluoranthene	0.194	mg/kg	5.9E-09	(mg/kg/day) (mg/kg/day)	7.3E-01		4.3E-09	4.1E-07	(mg/kg/day)	NA.	(mg/kg/day)	1 1
				1 ''	0.247	1	6.8E-09	(mg/kg/day) (mg/kg/day)	7.3E-03	(mg/kg/day)	4.9E-11	4.7E-07	(mg/kg/day)	NA NA	(mg/kg/day)	1 1
1				Chrysene Dibenzo(a,h)anthracene	0.046	mg/kg mg/kg	1.1E-09	(mg/kg/day) (mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	8.1E-09	7.7E-08	(mg/kg/day)	NA NA	(mg/kg/day)	1
1				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	4.8E-09	(mg/kg/day) (mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.5E-09	3.4E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
1				Aluminum	10,200	mg/kg	2.4E-04	(mg/kg/day) (mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>	3.51.09	1.7E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
				Arsenic	18.4	mg/kg mg/kg	4.4E-07	(mg/kg/day) (mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	6.6E-07	3.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
ľ	1			Chromium VI	13.3	mg/kg mg/kg	3.2E-07	(mg/kg/day) (mg/kg/day)	5.0E-01	1	1.6E-07	2.2E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.001
li .				Cobalt	12.3	mg/kg	3.2E-07 3.0E-07	(mg/kg/day) (mg/kg/day)	NA	(mg/kg/day) '	1.62-07	2.2E-05 2.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.007
				Iron	26,900	mg/kg mg/kg	6.5E-04	(mg/kg/day) (mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>		4.5E-02	(mg/kg/day) (mg/kg/day)	7.0E-01	(mg/kg/day) (mg/kg/day)	0.06
			Exp. Route Total	1	20,900	[ mg/kg	0.5E-04	(mg/kg/day)	NA	(ing/kg/day)	8.8E-07	4.52-02	(Illy/Ny/day)	7.00-01	(Hig/Kg/uay)	0.06
L	1		Exp. Houle rotal	JI			I				0.0E-UI	ــــــــــــــــــــــــــــــــــــــ				U.2

# TABLE 7.7 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	1	Car	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	
	·	,	'	Potential Concern	Value	Units	Intake/Exposul	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotier
					1	l	Value	Units	Value	Units	1	Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Central Shipyard	Dermal	Benzo(a)anthracene	0.278	mg/kg	2.6E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.9E-09	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	T
			1	Benzo(a)pyrene	0.194	mg/kg	1.8E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.3E-08	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.247	mg/kg	2.3E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.7E-09	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.282	mg/kg	2.6E-09	(mg/kg/day)	7.3E-03	(mg/kg/day)	1.9E-11	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	
	l	ľ		Dibenzo(a,h)anthracene	0.046	mg/kg	4.3E-10	(mg/kg/day)	7.3E+00	(mg/kg/day)	3.1E-09	3.0E-08	(mg/kg/day)	NA	(mg/kg/day)	
		ļ	1	Indeno(1,2,3-cd)pyrene	0.200	mg/kg	1.9E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.4E-09	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	1
			1	Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
	ļ.	ľ		Arsenic	18.4	mg/kg	4.0E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	6.0E-08	2.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009
	1			Chromium VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)		0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	1
				Cobalt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	
				Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total		•						8.1E-08	<b>I</b>				0.009
		Exposure Point Total		<u> </u>			i				9.6E-07					0.2
	Exposure Medium Total	I		······································							9.6E-07			=		0.2
	l Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.0E-7	mg/m³	3.4E-10	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.7E-11	2.4E-08	(mg/m³)	NA	(mg/m³)	
	l			Benzo(a)pyrene	1.4E-7	mg/m <sup>3</sup>	2.4E-10	(mg/m³)	1.1E-03	(ug/m³)-1	2.6E-10	1.6E-08	(mg/m³)	NA.	(mg/m³)	
				Benzo(b)fluoranthene	1.8E-7	mg/m <sup>3</sup>	3.0E-10	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.3E-11	2.1E-08	(mg/m³)	NA	(mg/m³)	
				Chrysene	2.0E-7	mg/m³	3.4E-10	(mg/m³)	1.1E-05	(ug/m³)-1	3.8E-12	2.4E-08	(mg/m³)	NA	(mg/m³)	
	j			Dibenzo(a,h)anthracene	3.3E-8	mg/m <sup>3</sup>	5.6E-11	(mg/m³)	1.2E-03	(ug/m³)-1	6.7E-11	3.9E-09	(mg/m³)	NA	(mg/m³)	
	ì			Indeno(1,2,3-cd)pyrene	1.4E-7	mg/m <sup>3</sup>	2.4E-10	(mg/m³)	1.1E-04	(ug/m³).1	2.7E-11	1.7E-08	(mg/m³)	NA	(mg/m <sup>3</sup> )	
	}			Aluminum	0.007	mg/m <sup>3</sup>	1.2E-05	(mg/m³)	NA NA	(ug/m³)-1		8.6E-04	(mg/m³)	5.0E-03	(mg/m <sup>3</sup> )	0.2
	ì			Arsenic	1.3E-5	mg/m <sup>3</sup>	2.2E-08	(mg/m³)	4.3E-03	(ug/m³)-1	9.6E-08	1,6E-06	(mg/m³)	1.5E-05	(mg/m <sup>3</sup> )	0.1
	ì			Chromium VI	9.5E-6	mg/m³	1.6E-08	(mg/m <sup>3</sup> )	8.4E-02	(ug/m <sup>3</sup> ).1	1.4E-06	1.1E-06	(mg/m³)	1.0E-04	(mg/m <sup>3</sup> )	0.01
	i	i		Cobalt	8.8E-6	mg/m³	1.5E-08	(mg/m <sup>3</sup> )	9.0E-03	(ug/m <sup>3</sup> )-1	1.3E-07	1.0E-06	(mg/m³)	2.0E-05	(mg/m <sup>3</sup> )	0.05
		Ì		iron	0.019	mg/m <sup>3</sup>	3.3E-05	(mg/m³)	NA NA	(ug/m <sup>3</sup> )-1		2.3E-03	(mg/m³)	NA	(mg/m³)	
			Exp. Route Total				<b> </b>	1 ( 7 /	·		1.6E-06	1	<u> </u>			0.3
	ļ	Exposure Point Total			* ********						1.6E-06					0.3
	Exposure Medium Total	Exposure Folia Total			<del></del>		<del> </del>				1.6E-06	1				0.3
Medium Total	Exposure Mediani Total		<del></del>				<del> </del>				2.5E-06					0.5
Groundwater	Groundwater	Control Shipperd	Ingestion	Aluminum	312	ug/L	1.1E-06	(mg/kg/day)	NA	(ma/ka/dau)-1	2.02.00	7.9E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00008
Groundwater	Groundwater	Central Shipyard	ingestion	Arsenic	78.1	ug/L	2.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	4.3E-07	2.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07
				Cadmium	1.5	ug/L	5.6E-09	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>	4.32-07	3.9E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0008
				Cobatt	24.8	ug/L	9.0E-08	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>		6.3E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
				Iron	65,800	ug/L	2.4E-04	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.02
				Manganese	9,100	ug/L	3.3E-05	(mg/kg/day)	NA NA	(mg/kg/day)		2.3E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.10
			Exp. Route Total	Manganese	9,100	ugrc	3.3L*03	(Hig/kg/day)	1 100	(mg/kg/day)	4.3E-07	2.52.05	(mg/kg/day)	2.42.02	(mg/mg/day)	0.2
	{			I Alicania	1 242	T	6.0E-07	(/	NA NA	/aaaa_1	4.32-07	4.2E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00004
		1	Dermal	Aluminum Arsenic	312 78.1	ug/L ug/L	1.5E-07	(mg/kg/day) (mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.2E-07	1.0E-05	(mg/kg/day) (mg/kg/day)	3.0E-04	(mg/kg/day) (mg/kg/day)	0.0004
							2.9E-09		1.5E+00	(mg/kg/day) <sup>-1</sup>	2.22-07	2.1E-07		2.5E-05		0.008
				Cadmium Cobalt	1.5 24.8	ug/L ug/L	1.9E-08	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.3E-06	(mg/kg/day) (mg/kg/day)	3.0E-03	(mg/kg/day) (mg/kg/day)	0.008
				1	65,800	ug/L ug/L	1.9E-08 1.3E-04	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		8.8E-03	(mg/kg/day) (mg/kg/day)	7.0E-01	(mg/kg/day) (mg/kg/day)	0.0004
				Iron			11	(mg/kg/day)	NA NA	(mg/kg/day)		1.2E-03		9.6E-04		0.01
			5 . 5	Manganese	9,100	ug/L	1.7E-05	(mg/kg/day)	I. NA	(mg/kg/day) <sup>-1</sup>	<u> </u>	1.26-03	(mg/kg/day)	9.00-04	(mg/kg/day)	<u> </u>
			Exp. Route Total	l			<del></del>		<u> </u>		2.2E-07	<b> </b>				1.3
		Exposure Point Total					<u></u>				6.5E-07	<u> </u>				1.5
	Exposure Medium Total						<u></u>				6.5E-07	<u> </u>				1.5
Medium Total											6.5E-07					1.5
							Tota	I Cancer Risks for	Surface Soil an	d Subsurface Soil	3.9E-06	Total H	azerd Indices for S	urface Soil and	1 Subsurface Soil	2.7

Notor

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.8.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	tions			Non-Ca	ncer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposur	re Concentration	CSF/I	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rt	D/RfC	Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	<u> </u>
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.8E-06	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.3E-06	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	
			1	Benzo(a)pyrene	0.140	mg/kg	8.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	6.0E-06	1.8E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.340	mg/kg	2.0E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.5E-06	4.3E-06	(mg/kg/day)	NA	(mg/kg/day)	
			1	Chrysene	0.300	mg/kg	1.8E-06	(mg/kg/day)	7.3E-03	(mg/kg/day)-1	1.3E-08	3.8E-06	(mg/kg/day)	NA.	(mg/kg/day)	8
				Arsenic	23.7	mg/kg	2.6E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)	3.9E-05	3.0E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.0
				Chromium VI	17.3	mg/kg	1.0E-04	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	5.1E-05	2.2E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.07
				Cobalt	14.6	mg/kg	1.6E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.9E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.6
				Iron	32,500	mg/kg	3.6E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.2E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.6
				Manganese	435	mg/kg	4.8E-04	(mg/kg/day)	NA	(mg/kg/day)		5.6E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.2
			Exp. Route Total	1				1	<u></u>	,	9.8E-05	1		•		2.5
			Dermal	Benzo(a)anthracene	0.300	mg/kg	6.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day).1	4.7E-07	1.4E-06	(mg/kg/day)	NA.	(mg/kg/day)	
}			Jonna.	Benzo(a)pyrene	0.140	mg/kg	3.0E-07	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	2.2E-06	6.5E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
		•		Benzo(b)fluoranthene	0.340	mg/kg	7.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	5.3E-07	1.6E-06	(mg/kg/day)	NA	(mg/kg/day)	
	1			Chrysene	0.300	mg/kg	6.4E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	4.7E-09	1.4E-06	(mg/kg/day)	NA.	(mg/kg/day)	
		ŀ		Arsenic	23.7	mg/kg	2.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.3E-06	2.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
		Ì		Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)	5.52-00	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	1
		Ì		Cobalt	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	1 . !
		ř	i	(ron	32.500	ma/ka	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day).1		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	1
				Manganese	435	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	_
			Fun Davida Tatal	Manganese	435	ilig/kg	0.0E+00	(mg/kg/day)	INA	(mg/kg/day)	6.4E-06	0.02+00	(mg/kg/day)	9.0L-04	(mg/kg/day/	0.08
			Exp. Route Total								1.0E-04	-				2.6
		Exposure Point Total				·			·							2.6
	Exposure Medium Total										1.0E-04				т .	
	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m <sup>3</sup>	1.2E-11	(mg/m³)	1.1E-04	(ug/m³)-1	1.3E-12	2.6E-11	(mg/m³)	NA	(mg/m³)	
				Benzo(a)pyrene	1.3E-11	mg/m <sup>3</sup>	5.6E-12	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.1E-12	1.2E-11	(mg/m³)	NA	(mg/m³)	
				Benzo(b)fluoranthene	3.1E-11	mg/m <sup>3</sup>	1.4E-11	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.5E-12	3.0E-11	(mg/m³)	NA	(mg/m³)	
				Chrysene	2.7E-11	mg/m³	1.2E-11	(mg/m³)	1.1E-05	(ug/m³)-1	1.3E-19	2.6E-11	(mg/m³)	NA	(mg/m³)	-
		•		Arsenic	2.2E-9	mg/m³	1.8E-10	(mg/m³)	4.3E-03	(ug/m³)-1	7.6E-10	2.1E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001
		•		Chromium VI	1.6E-9	mg/m³	6.9E-10	(mg/m³)	8.4E-02	(ug/m³)-1	5.8E-08	1.5E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002
			i	Cobalt	1.3E-9	mg/m³	1.1E-10	(mg/m³)	9.0E-03	(ug/m³).1	9.8E-10	1.3E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0002
	}			Iron	3.0E-6	mg/m <sup>3</sup>	2.4E-07	(mg/m³)	NA NA	(ug/m³) <sup>-1</sup>		2.8E-06	(mg/m³)	NA	(mg/m³)	"
	Į.			Manganese	4.0E-8	mg/m <sup>3</sup>	3.3E-09	(mg/m³)	NA	(ug/m³)-1		3.8E-08	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	0.0008
			Exp. Route Total								6.0E-08	<u> </u>				0.001
		Exposure Point Total									6.0E-08	l				0.001
	Exposure Medium Total								•		6.0E-08					0.001
Medium Total											1.0E-04					2.6
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.278	mg/kg	1.6E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.2E-06	3.6E-06	(mg/kg/day)	NA	(mg/kg/day)	
1				Benzo(a)pyrene	0.194	mg/kg	1.1E-06	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	8.3E-06	2.5E-06	(mg/kg/day)	NA.	(mg/kg/day)	
		1		Benzo(b)fluoranthene	0.247	mg/kg	1.4E-06	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	1.1E-06	3.2E-06	(mg/kg/day)	NA	(mg/kg/day)	1 !
		1	1	Chrysene	0.282	mg/kg	1.6E-06	(mg/kg/day)	7.3E-03	(mg/kg/day)	1.2E-08	3.6E-06	(mg/kg/day)	NA	(mg/kg/day)	!
			1	Dibenzo(a,h)anthracene	0.046	mg/kg	2.7E-07	(mg/kg/day)	7.3E+00	(mg/kg/day)	2.0E-06	5.9E-07	(mg/kg/day)	NA.	(mg/kg/day)	
			1	Indeno(1,2,3-cd)pyrene	0.200	mg/kg	1.2E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	8.5E-07	2.6E-06	(mg/kg/day)	NA.	(mg/kg/day)	
			1	Aluminum	10,200	mg/kg	1.1E-02	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.3E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.1
			1	Arsenic	18.4	mg/kg	2.0E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.0E-05	2.4E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.8
		1	1	Chromium VI	13.3	ma/ka	7.8E-05	(mg/kg/day)	5.0E-01	(mg/kg/day)-'	3.9E-05	1.7E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.06
			1	Cobalt	12.3	ma/ka	1.3E-05	(mg/kg/day)	NA	(mg/kg/day)	3.32-05	1.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.5
ł			i	Iron	26,900	mg/kg	2.9E-02	(mg/kg/day) (mg/kg/day)	NA NA	(mg/kg/day)		3.4E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.5
l .		1	Fun Davida Total	11011	20,900	I ing/kg	2.9E-02	(mg/kg/day)	1 195	(mg/kg/day)	8.2E-05	1 3.42.01	1 (mg/kg/ddy)	1.00-01	(ing/kgroay)	2.0
	_1		Exp. Route Total				1				0.20-03					

# TABLE 7.8.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timetrame: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	Ī E	PC		Can	cer Risk Calcula	tions			Non-Ca	ncer Hazard C	alculations	
	'	· "	,	Potential Concern	Value	Units	Intake/Exposur	e Concentration		Init Risk	Cancer Risk	Intake/Exposur	re Concentration	Rf	D/RIC	Hazard Quotient
			1	1			Value	Units	Value	Units		Value	Units	Value	Units	1
Subsurface Soil	Subsurface Soil	Central Shipyard	Dermal	Benzo(a)anthracene	0.278	mg/kg	5.9E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	4.3E-07	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	
		'''		Benzo(a)pyrene	0.194	mg/kg	4.1E-07	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	3.0E-06	9.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.247	mg/kg	5.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.8E-07	1.1E-06	(mg/kg/day)	NA.	(mg/kg/day)	
	1		i	Chrysene	0.282	mg/kg	6.0E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	4.4E-09	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	
	}			Dibenzo(a,h)anthracene	0.046	mg/kg	9.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	7.1E-07	2.1E-07	(mg/kg/day)	NA.	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	4.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.1E-07	9.3E-07	(mg/kg/day)	NA	(mg/kg/day)	
	1			Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
	ł			Arsenic	18.4	mg/kg	1.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.5E-06	2.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07
				Chromium VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
		1		Cobatt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total	1	•					A E. V	7.4E-06	ì			•	0.07
		Exposure Point Total	<u> </u>	<del></del>			1				9.0E-05					2.1
	Exposure Medium Total		• • • • • • • • • • • • • • • • • • • •				1				9.0E-05					2.1
	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.5E-11	mg/m³	1.1E-11	(mg/m³)	1.1E-04	(ug/m³).1	1.2E-12	2.4E-11	(mg/m³)	NA	(mg/m³)	
	D"	Oomia Siipyalu	I IIII I I I I I I I I I I I I I I I I	Benzo(a)pyrene	1.8E-11	mg/m	7.7E-12	(mg/m <sup>3</sup> )	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	8.5E-12	1.7E-11	(mg/m³)	NA NA	(mg/m³)	
				Benzo(b)fluoranthene	2.2E-11	mg/m <sup>3</sup>	9.8E-12	(mg/m³)	1.1E-04	(ug/m³)-1	1.1E-12	2.2E-11	(mg/m³)	NA.	(mg/m³)	
				Chrysene	2.6E-11	mg/m³	1.1E-11	(mg/m³)	1.1E-05	(ug/m³)-1	1.2E-13	2.5E-11	(mg/m³)	NA.	(mg/m³)	
				Dibenzo(a,h)anthracene	4.2E-12	mg/m <sup>3</sup>	1.8E-12	(mg/m³)	1.2E-03	(ug/m³)-1	2.2E-12	4.0E-12	(mg/m³)	NA.	(mg/m³)	
				Indeno(1,2,3-cd)pyrene	1.8E-11	mg/m <sup>3</sup>	8.0E-12	(mg/m <sup>3</sup> )	1.1E-04	(ug/m³)-1	8.8E-13	1.7E-11	(mg/m³)	NA.	(mg/m³)	
				Aluminum	9.3E-7	mg/m³	7.6E-08	(mg/m³)	NA NA	(ug/m <sup>3</sup> )-1	0.0013	8.9E-07	(mg/m³)	5.0E-03	(mg/m³)	0.0002
				Arsenic	1.7E-9	mg/m³	1.4F-10	(mg/m <sup>3</sup> )	4.3E-03	(ug/m³)·1	5.9E-10	1.6E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0002
				Chromium VI	1.2E-9	mg/m <sup>3</sup>	5.3E-10	(mg/m³)	8.4E-02	(ug/m³)-1	4.5E-08	1.2E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00001
				Cobalt	1.1E-9	mg/m <sup>3</sup>	9.2E-11	(mg/m³)	9.0E-03	(ug/m³)-1	8.3E-10	1.1E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0002
				Iron	2.4E-6	mg/m³	2.0E-07	(mg/m³)	NA	(ug/m³)·1	0.02.10	2.3E-06	(mg/m³)	NA	(mg/m³)	
			Exp. Route Total	1	2.42-0	i iig/iii	2.02-07	(1119/111)		(ug/iir)	4.6E-08	1 2.02.00	(1119/1117		(///9/11/	0.0005
		Exposure Point Total	Exp. House Total	<u> </u>			<u> </u>				4.6E-08					0.0005
		Exposure Point rotal					ļ				4.6E-08	<b>!</b>				0.0005
	Exposure Medium Total			<del></del>							9.0E-05		·····			2.1
Medium Total			1	I		<del></del>				T 7		2.05.50	I 4	105.00	T	
Groundwater	Groundwater	Central Shipyard	Ingestion	Aluminum	312	ug/L	1.7E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
				Arsenic	78.1	ug/L	4.3E-04	(mg/kg/day)	1.5E+00	(mg/kg/day)	6.4E-04	5.0E-03	(mg/kg/day)	3.0E-04	(mg/kg/day)	17
		1		Cadmium	1.5	ug/L	8.4E-06	(mg/kg/day)	NA NA	(mg/kg/day)		9.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.2
				Cobait	24.8	ug/L	1.4E-04	(mg/kg/day)	NA 	(mg/kg/day)		1.6E-03	(mg/kg/day)	3.0E-04	(mg/kg/day)	5.3
				Iron	65,800	ug/L	3.6E-01	(mg/kg/day)	NA 	(mg/kg/day)		4.2E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	6.0
		ĺ		Manganese	9,100	ug/L	5.0E-02	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		5.8E-01	(mg/kg/day)	2.4E-02	(mg/kg/day)	24
			Exp. Route Total		<b></b>		ļ				6.4E-04		··· · · · · · · · · · · · · · · · · ·		т	52
			Dermai	Aluminum	312	ug/L	1.1E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-</sup>		1.3E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0001
				Arsenic	78.1	ug/L	2.8E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) '	4.2E-06	3.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Cadmium	1.5	ug/L	5.5E-08	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		6.5E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.03
						ua/L	3.6E-07	(mg/kg/day)	NA NA	(mg/kg/day)		4.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Cobalt	24.8	-9	П									
				Cobalt Iron	65,800	ug/L	2.4E-03	(mg/kg/day)	NA NA	(mg/kg/day)`		2.8E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
				1	1 -		2.4E-03 3.3E-04	(mg/kg/day) (mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>		2.8E-02 3.8E-03	(mg/kg/day) (mg/kg/day)	7.0E-01 9.6E-04	(mg/kg/day) (mg/kg/day)	4.0
			Exp. Route Total	Iron	65,800	ug/L	11	, ,				К				1 .
		Exposure Point Total	Exp. Route Total	Iron	65,800	ug/L	11	, ,				К				4.0
	Exposure Medium Total	Exposure Point Total	Exp. Route Total	Iron	65,800	ug/L	11	, ,			4.2E-06	К				4.0
Medium Total	Exposure Medium Total	Exposure Point Total	Exp. Route Total	Iron	65,800	ug/L	11	, ,			4.2E-06 6.5E-04	К				4.0 4.2 57
Medium Total	Exposure Medium Total	Exposure Point Total	Exp. Route Total	Iron	65,800	ug/L	3.3E-04	, ,	NA	(mg/kg/day) <sup>-1</sup>	4.2E-06 6.5E-04 6.5E-04	3.8E-03		9.6E-04	(mg/kg/day)	4.0 4.2 57 57

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.9. RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVISTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	li	Car	ncer Risk Calcula	lions			Non-Ca	ncer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
	1					İ	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.300	mg/kg	2.6E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.9E-07	4.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
		• • •		Benzo(a)pyrene	0.140	mg/kg	1.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	8.8E-07	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.340	mg/kg	2.9E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.1E-07	4.7E-07	(mg/kg/day)	NA	(mg/kg/day)	
l				Chrysene	0.300	mg/kg	2.6E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.9E-09	4.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
li .	İ			Arsenic	23.7	mg/kg	1.1E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.7E-05	3.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Chromium VI	17.3	mg/kg	1.5E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	7.4E-06	2.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.008
1	1			Cobalt	14.6	mg/kg	6.9E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07
l .				Iron	32,500	mg/kg	1.5E-02	(mg/kg/day)	. NA	(mg/kg/day)		4.5E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06
1			ì	Manganese	435	mg/kg	2.0E-04	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		6.0E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
			Exp. Route Total								2.5E-05	]				0.3
			Dermal	Benzo(a)anthracene	0.300	mg/kg	1.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	9.8E-08	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.140	mg/kg	6.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	4.6E-07	9.9E-08	(mg/kg/day)	NA NA	(mg/kg/day)	K
			1	Benzo(b)fluoranthene	0.340	mg/kg	1.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.1E-07	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
li .			Ì	Chrysene	0.300	mg/kg	1.3E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	9.8E-10	2.1E-07	(mg/kg/day)	NA NA	(mg/kg/day)	- 1
			1	Arsenic	23.7	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.0E-06	3.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
1			1	Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
H	}		1	Cobalt	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	-
ŀ				Iron	32,500	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	-
				Manganese	435	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total								2.7E-06	l				0.01
		Exposure Point Total									2.8E-05					0.3
	Exposure Medium Total										2.8E-05					0.3
	1iA	Central Shipyard	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	1.6E-11	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	1.8E-12	2.6E-11	(mg/m³)	NA NA	(mg/m³)	
ļ.				Benzo(a)pyrene	1.3E-11	mg/m <sup>3</sup>	7.7E-12	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	8.4E-12	1.2E-11	(mg/m³)	NA.	(mg/m³)	•
ŀ				Benzo(b)fluoranthene	3.1E-11	mg/m³	1.9E-11	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.0E-12	3.0E-11	(mg/m³)	NA	(mg/m³)	-
i				Chrysene	2.7E-11	mg/m³	1.6E-11	(mg/m <sup>3</sup> )	1.1E-05	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.8E-13	2.6E-11	(mg/m³)	NA NA	(mg/m³)	
	1			Arsenic	2.2E-9	mg/m³	7.1E-10	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.0E-09	2.1E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001
	}			Chromium VI	1.6E-9	mg/m <sup>3</sup>	9.5E-10	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	8.0E-08	1.5E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002
lt .				Cobalt	1.3E-9	mg/m <sup>3</sup>	4.4E-10	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-09	1.3E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0002
1				Iron	3.0E-6	mg/m³	9.7E-07	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.8E-06	(mg/m³)	NA NA	(mg/m³)	- I
			1	Manganese	4.0E-8	mg/m³	1.3E-08	(mg/m³)	NA NA	(ug/m <sup>3</sup> )-1		3.8E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0008
			Exp. Route Total								8.7E-08					0.001
		Exposure Point Total	- Marine								8.7E-08					0.001
	Exposure Medium Total						1				8.7E-08					0.001
Medium Total											2.8E-05					0.3
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.278	mg/kg	2.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.7E-07	3.8E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.194	mg/kg	1.7E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.2E-06	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	
1			1	Benzo(b)fluoranthene	0.247	mg/kg	2.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.6E-07	3.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
			1	Chrysene	0.282	mg/kg	2.4E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.8E-09	3.9E-07	(mg/kg/day)	NA	(mg/kg/day)	1 - 1
			1	Dibenzo(a,h)anthracene	0.046	mg/kg	4.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)	2.9E-07	6.3E-08	(mg/kg/day)	NA	(mg/kg/day)	- 1
			1	Indeno(1,2,3-cd)pyrene	0.200	mg/kg	1.7E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.3E-07	2.7E-07	(mg/kg/day)	NA NA	(mg/kg/day)	- 1
1			1	Aluminum	10,200	mg/kg	4.8E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.4E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
	1			Arsenic	18.4	mg/kg	8.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.3E-05	2.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
	)			Chromlum VI	13.3	mg/kg	1.1E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	5.7E-06	1.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006
	1			Cobalt	12.3	mg/kg	5.8E-06	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.7E-05	(mg/kg/đay)	3.0E-04	(mg/kg/day)	0.06
I	1			Iron	26,900	mg/kg	1.3E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.05
ii .	1	1	Exp. Route Total	1			1				2.1E-05	1				0.2

# TABLE 7.9 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	cer Risk Calcula	tions			Non-Ca	ncer Hazard C	alculations	
		· ·	1	Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/L	Init Risk	Cancer Risk	Intake/Exposur	e Concentration	Rt	D/RfC	Hazard Quotient
					1		Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soll	Subsurface Soil	Central Shipyard	Dermal	Benzo(a)anthracene	0.278	mg/kg	1.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	9.1E-08	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.194	ma/ka	8.7E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	6.3E-07	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
			ľ	Benzo(b)fluoranthene	0.247	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	8.1E-08	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.282	mg/kg	1.3E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	9.2E-10	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.046	mg/kg	2.1E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.5E-07	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	indeno(1,2,3-cd)pyrene	0.200	mg/kg	8.9E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6.5E-08	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
	1			Aluminum	10,200	ma/ka	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			1	Arsenic	18.4	mg/kg	1.0E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.6E-06	3.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromlum VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total	1							2.6E-06	<u> </u>				0.01
		Exposure Point Total		1							2.3E-05	i				0.2
	Exposure Medium Total					···· ··· · · · · · · · · · · · · · · ·	<del> </del>				2.3E-05	it				0.2
1	Exposore Mediani ) ((8)	Central Shipyard	Inhalation	Benzo(a)anthracene	2.5E-11	m=/m³	1.5E-11	(mg/m³)	1.1E-04	(ug/m³) <sup>-1</sup>	1.7E-12	2.4E-11	(mg/m³)	NA	(mg/m³)	
1	Air	Central Snipyard	innaiation	Benzo(a)anthracene Benzo(a)pyrene	1.8E-11	mg/m <sup>3</sup> mg/m <sup>3</sup>	1.1E-11	(mg/m <sup>-</sup> ) (mg/m <sup>3</sup> )	1.1E-04	(ug/m <sup>-)</sup>	1.7E-12 1.2E-11	1.7E-11	(mg/m <sup>-</sup> ) (mg/m <sup>3</sup> )	NA NA	(mg/m <sup>3</sup> )	
			1		2.2E-11	mg/m³	1.4E-11	(mg/m <sup>3</sup> )	1.1E-03	(ug/m <sup>3</sup> )-1	1.5E-12	2.2E-11	(mg/m) (mg/m³)	NA.	(mg/m³)	
l			İ	Benzo(b)fluoranthene	2.6E-11	ı .	1.5E-11	(mg/m <sup>-</sup> ) (mg/m <sup>3</sup> )	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.7E-13	2.5E-11	(mg/m <sup>3</sup> )	NA.	(mg/m³)	
l			1	Chrysene Dibenzo(a,h)anthracene	4.2E-12	mg/m³ mg/m³	2.5E-12	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.0E-12	4.0E-12	(mg/m³)	NA.	(mg/m³)	
İ			1	Indeno(1,2,3-cd)pyrene	1.8E-11	mg/m <sup>3</sup>	1.1E-11	(mg/m <sup>3</sup> )	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.2E-12	1.7E-11	(mg/m³)	NA.	(mg/m³)	
i				Aluminum	9.3E-7	mg/m <sup>3</sup>	3.0E-07	(mg/m <sup>3</sup> )	NA	(ug/m³)·1	1.20-12	8.9E-07	(mg/m <sup>3</sup> )	5.0E-03	(mg/m³)	0.0002
İ	1			Arsenic	1.7E-9	mg/m <sup>3</sup>	5.5E-10	(mg/m <sup>3</sup> )	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.4E-09	1.6E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001
l	1			Chromium VI	1.2E-9	mg/m <sup>3</sup>	7.3E-10	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> )-1	6.1E-08	1.2E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00001
İ	1			Cobalt	1.1E-9	mg/m³	3.7E-10	(mg/m³)	9.0E-03	(ug/m³)·1	3.3E-09	1.1E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0002
l				Iron	2.4E-6	ma/m³	8.0E-07	(mg/m³)	NA	(ug/m³)-1		2.3E-06	(mg/m³)	NA	(mg/m³)	
l			Exp. Route Total	1	2.42-0	nigini	0.02-07	(1/19/11/	III	(ug/iii /	6.7E-08	2.02.00	(mg/m)		1(g//	0.0005
		5 5 5 1 5 1 1	Exp. Houle Total	L							6.7E-08	ļ				0.0005
ı		Exposure Point Total					ļ	-						-		0.0005
	Exposure Medium Total				···						6.7E-08					
Medium Total					.,						2.3E-05		T		<del>,</del>	0.2
Groundwater	Groundwater	Central Shipyard	Ingestion	Aluminum	312	ug/L	2.9E-03	(mg/kg/day)	NA	(mg/kg/day)	**	8.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.009
				Arsenic	78.1	ug/L	7.3E-04	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.1E-03	2.1E-03	(mg/kg/day)	3.0E-04	(mg/kg/day)	7.1
İ			1	Cadmium	1.5	ug/L	1.4E-05	(mg/kg/day)	NA	(mg/kg/day) '		4.2E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.08
i			1	Cobalt	24.8	ug/L	2.3E-04	(mg/kg/day)	NA	(mg/kg/day) '		6.8E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.3
1		l .		Iron	65,800	ug/L	6.2E-01	(mg/kg/day)	NA	(mg/kg/day)		1.8E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	2.6
	+					ug/L		(mg/kg/day)	NA NA	(mg/kg/day) '		2.5E-01	(mg/kg/day)	2.4E-02	(mg/kg/day)	10
				Manganese	9,100	ugr	8.5E-02	(ingragial)								22
			Exp. Route Total	Manganese	9,100	1 49.2	8.5E-02	(mg/kg/dd)/			1.1E-03				,	
			Exp. Route Total	Manganese Aluminum	312	ug/L	1.5E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.5E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00004
					312 78.1		1.5E-05 3.8E-06		1.5E+00	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>		1.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04
				Aluminum	312	ug/L	1.5E-05	(mg/kg/day)				II .				1
				Aluminum Arsenic	312 78.1	ug/L ug/L	1.5E-05 3.8E-06 7.5E-08 4.9E-07	(mg/kg/day) (mg/kg/day)	1.5E+00 NA NA	(mg/kg/day) <sup>-1</sup>	5.7E-06	1.1E-05 2.2E-07 1.4E-06	(mg/kg/day) (mg/kg/day) (mg/kg/day)	3.0E-04 2.5E-05 3.0E-04	(mg/kg/day) (mg/kg/day) (mg/kg/day)	0.04 0.009 0.005
				Aluminum Arsenic Cadmium	312 78.1 1.5	ug/L ug/L ug/L	1.5E-05 3.8E-06 7.5E-08	(mg/kg/day) (mg/kg/day) (mg/kg/day)	1.5E+00 NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>	5.7E-06	1.1E-05 2.2E-07	(mg/kg/day) (mg/kg/day)	3.0E-04 2.5E-05 3.0E-04 7.0E-01	(mg/kg/day) (mg/kg/day)	0.04 0.009
				Aluminum Arsenic Cadmium Cobalt	312 78.1 1.5 24.8	ug/L ug/L ug/L ug/L	1.5E-05 3.8E-06 7.5E-08 4.9E-07	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	1.5E+00 NA NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>	5.7E-06 	1.1E-05 2.2E-07 1.4E-06	(mg/kg/day) (mg/kg/day) (mg/kg/day)	3.0E-04 2.5E-05 3.0E-04	(mg/kg/day) (mg/kg/day) (mg/kg/day)	0.04 0.009 0.005
				Aluminum Arsenic Cadmium Cobalt tron	312 78.1 1.5 24.8 65,800	ug/L ug/L ug/L ug/L ug/L	1.5E-05 3.8E-06 7.5E-08 4.9E-07 3.2E-03	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	1.5E+00 NA NA NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>	5.7E-06 	1.1E-05 2.2E-07 1.4E-06 9.4E-03	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	3.0E-04 2.5E-05 3.0E-04 7.0E-01	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	0.04 0.009 0.005 0.01
		Exposure Point Total	Dermal	Aluminum Arsenic Cadmium Cobalt tron	312 78.1 1.5 24.8 65,800	ug/L ug/L ug/L ug/L ug/L	1.5E-05 3.8E-06 7.5E-08 4.9E-07 3.2E-03	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	1.5E+00 NA NA NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>	5.7E-06   	1.1E-05 2.2E-07 1.4E-06 9.4E-03	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	3.0E-04 2.5E-05 3.0E-04 7.0E-01	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	0.04 0.009 0.005 0.01 1.4
	Exposura Madium Total	Exposure Point Total	Dermal	Aluminum Arsenic Cadmium Cobalt tron	312 78.1 1.5 24.8 65,800	ug/L ug/L ug/L ug/L ug/L	1.5E-05 3.8E-06 7.5E-08 4.9E-07 3.2E-03	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	1.5E+00 NA NA NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>	5.7E-06  5.7E-06	1.1E-05 2.2E-07 1.4E-06 9.4E-03	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	3.0E-04 2.5E-05 3.0E-04 7.0E-01	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	0.04 0.009 0.005 0.01 1.4
Motion Total	Exposure Medium Total	Exposure Point Total	Dermal	Aluminum Arsenic Cadmium Cobalt tron	312 78.1 1.5 24.8 65,800	ug/L ug/L ug/L ug/L ug/L	1.5E-05 3.8E-06 7.5E-08 4.9E-07 3.2E-03	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	1.5E+00 NA NA NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>	5.7E-06  5.7E-06 1.1E-03	1.1E-05 2.2E-07 1.4E-06 9.4E-03	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	3.0E-04 2.5E-05 3.0E-04 7.0E-01	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	0.04 0.009 0.005 0.01 1.4 1.4 24
Medium Tolal	Exposure Medium Total	Exposure Point Total	Dermal	Aluminum Arsenic Cadmium Cobalt tron	312 78.1 1.5 24.8 65,800	ug/L ug/L ug/L ug/L ug/L	1.5E-05 3.8E-06 7.5E-08 4.9E-07 3.2E-03 4.5E-04	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	1.5E+00 NA NA NA NA	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>	5.7E-06  5.7E-06 1.1E-03	1.1E-05 2.2E-07 1.4E-06 9.4E-03 1.3E-03	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	3.0E-04 2.5E-05 3.0E-04 7.0E-01 9.6E-04	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	0.04 0.009 0.005 0.01 1.4 1.4

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guldance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



# LIST OF TABLES RAGS PART D TABLE 7 - FORMER BUILDING 234 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.	
	Reasonable Maximum Exposures
7.1.RME	Current Adolescent Trespassers - Central Shipyard
7.2.RME	Current Adult Trespassers - Central Shipyard
7.3.RME	Current Industrial Workers - Central Shipyard
7.4.RME	Future Adolescent Trespassers - Central Shipyard
7.5.RME	Future Adult Trespassers - Central Shipyard
7.6.RME	Future Industrial Workers - Central Shipyard
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - Central Shipyard
7.9.RME	Hypothetical Adult Residents - Central Shipyard

# TABLE 7.1 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	T	PC	1		ncer Risk Calcula	tions		<u> </u>	Non Co	ncer Hazard C	alculations	
iviedium	Exposure Meniniii	Exposure rount	Cxposore noute	Potential Concern	Value	Units	Intake/Evposus	e Concentration		Init Risk	Cancer Risk	tntake/Eynosur	re Concentration		D/RfC	Hazerd Quotient
l			1	l otermal concern	Value	Utilità	Value	Units	Value	Units	Cancer Hisk	Value	Units	Value	Units	Trazara adonera
Surface Sull	0	5 D.:V-V 004	1	D	0.004		3.7E-08		7.3E-01	<del>-</del>	2.7E-08	8.5E-08	(mg/kg/day)	NA	(mg/kg/day)	
Surface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.324	mg/kg	n	(mg/kg/day)	1	(mg/kg/day)	2.7E-08 2.4E-07	7.6E-08		NA NA		
ļ				Benzo(a)pyrene	0.288	mg/kg	3.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)		II .	(mg/kg/day)	NA NA	(mg/kg/day)	
li .				Benzo(b)fluoranthene	0.477	mg/kg	5.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	3.9E-08	1.3E-07 1.1E-07	(mg/kg/day)	1	(mg/kg/day)	ľ
1			ļ	Chrysene	0.409	mg/kg	4.6E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) '	3.4E-10	II .	(mg/kg/day)	NA NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.062	mg/kg	7.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) 1	5.1E-08	1.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
1				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	2.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.5E-08	4.7E-08	(mg/kg/day)	NA .	(mg/kg/day)	
1				Arsenic	17.9	mg/kg	6.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.0E-06	4.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
1				Beryllium	3.20	mg/kg	1.2E-07	(mg/kg/day)	NA 	(mg/kg/day)		8.4E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0004
1			1	Cadmium	13.0	mg/kg	4.9E-07	(mg/kg/day)	NA 5 0 5 0 4	(mg/kg/day)		3.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.007
l	i			Chromium VI	83.0	mg/kg	9.4E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	4.7E-06	2.2E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.007
	l			Cobalt	20.0	mg/kg	7.5E-07	(mg/kg/day)	NA NA	(mg/kg/day)		5.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
1	(			Iron	32,100	mg/kg	1.2E-03	(mg/kg/day)	NA NA	(mg/kg/day)		8.4E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
į.	(			Lead	54	mg/kg	2.0E-06	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.4E-05	(mg/kg/day)	NA	(mg/kg/day)	
	1			Manganese	509.0	mg/kg	1.9E-05	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.006
			Exp. Route Total	<u></u>		,					6.1E-06	<u></u>				0.07
			Dermal	Benzo(a)anthracene	0.324	mg/kg	1.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	7.6E-08	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.288	mg/kg	9.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	6.8E-07	2.2E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
1	1			Benzo(b)fluoranthene	0.477	mg/kg	1.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.1E-07	3.6E-07	(mg/kg/day)	NA	(mg/kg/day)	
1	ł			Chrysene	0.409	mg/kg	1.3E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	9.6E-10	3.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
1	1			Dibenzo(a,h)anthracene	0.062	mg/kg	2.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.5E-07	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)	
			i	indeno(1,2,3-cd)pyrene	0.180	mg/kg	5.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.2E-08	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
1				Arsenic	17.9	mg/kg	4.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	6.7E-07	3.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
1			1	Beryllium	3.20	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	
				Cedmium	13.0	mg/kg	1.1E-08	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		7.5E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.003
•				Chromium VI	83.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	- 1
				Cobalt	20.0	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	- 1
				Iron	32,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
JI				Lead	54	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	
1				Manganese	509.0	mg/kg	0.0E+00	(mg/kg/day)	NA .	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
1			Exp. Route Total								1.7E-06	l				0.01
		Exposure Point Total									7.8E-06					0.08
	Exposure Medium Total	L									7.8E-06					0.0B
l l	Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.9E-11	mg/m³	2.8E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.0E-14	6.5E-13	(mg/m³)	NA NA	(mg/m³)	
				Benzo(a)pyrene	2.6E-11	mg/m³	2.5E-13	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.7E-13	5.7E-13	(mg/m³)	NA NA	(mg/m³)	
				Benzo(b)fluoranthene	4.3E-11	mg/m³	4.1E-13	(mg/m³)	1.1E-04	(ug/m³)-1	4.5E-14	9.5E-13	(mg/m³)	NA	(mg/m³)	
			i	Chrysene	3.7E-11	mg/m <sup>3</sup>	3.5E-13	(mg/m <sup>3</sup> )	1.1E-05	(ug/m³)-1	3.8E-15	8.1E-13	(mg/m³)	NA.	(mg/m³)	
1				Dibenzo(a,h)anthracene	5.6E-12	mg/m <sup>3</sup>	5.3E-14	(mg/m³)	1.2E-03	(ug/m³)-1	6.4E-14	1.2E-13	(mg/m³)	NA	(mg/m³)	
				Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m <sup>3</sup>	1.5E-13	(mg/m³)	1.1E-04	(ug/m³)·1	1.7E-14	3.6E-13	(mg/m³)	NA	(mg/m³)	-
	!		ł	Arsenic	1.6E-9	mg/m <sup>3</sup>	5.1E-12	(mg/m³)	4.3E-03	(ug/m³)-1	2.2E-11	3.6E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000002
				Beryllium	2.9E-10	mg/m³	9.1E-13	(mg/m <sup>3</sup> )	2.4E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.2E-12	6.4E-12	(mg/m³)	2.0E-05	(mg/m³)	3.2E-7
				Cadmium	1.2E-9	mg/m³	3.7E-12	(mg/m <sup>3</sup> )	1.8E-03	(ug/m³)-1	6.7E-12	2.6E-11	(mg/m³)	2.0E-05	(mg/m³)	0.000001
				Chromium VI	7.5E-9	mg/m <sup>3</sup>	7,1E-11	(mg/m <sup>3</sup> )	8.4E-02	(ug/m <sup>3</sup> )-1	6.0E-09	1.7E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000002
1				Cobalt	1.8E-9	mg/m <sup>3</sup>	5.7E-12	(mg/m³)	9.0E-03	(ug/m³)·1	5.1E-11	4.0E-11	(mg/m³)	6.0E-06	(mg/m <sup>3</sup> )	0.000007
				Iron	2.9E-6	mg/m <sup>3</sup>	9.1E-09	(mg/m³)	NA	(ug/m³)·1		6.4E-08	(mg/m³)	NA	(mg/m³)	
				Lead	4.9E-9	mg/m <sup>3</sup>	1.5E-11	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		1.1E-10	(mg/m³)	NA	(mg/m³)	
				Manganese	4.6E-8	mg/m <sup>3</sup>	1.4E-10	(mg/m³)	NA	(ug/m³)-1		1.0E-09	(mg/m³)	5.0E-05	(mg/m <sup>3</sup> )	0.00002
			Exp. Route Total		1	1	1	, (g)			6.0E-09	1	(/		1 (3)	0.00003
N .		Exposure Point Total	J. C. P. L. Carlo I. Oldi	L			<del> </del>				6.0E-09	· · · · · · · · · · · · · · · · · · ·				0.00003
	Evangura Madison Total	LAPOSUIE FORIL TOTAL		· · · · · · · · · · · · · · · · · · ·		-					6.0E-09	<del> </del>				0.00003
Markey Taket	Exposure Medium Total										7.8E-06	<del></del>				0.00003
Medium Total							JL			4		<del></del>	T-1-1-75		A All 14 - " :	
								Total o	1 Heceptor Risks	Across All Media	7.8E-06	J	Total of Rec	eptor Hazards	Across All Media	0.08

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guldance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.2.RME

## CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

### REASONABLE MAXIMUM EXPOSURES

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Surface Soil  Surface Soil  Exposure Medium Total Air		Exposure Route	Chemical of		PC			ncer Risk Calcula					ncer Hazard Ca		
			Potential Concern	Value	Units		e Concentration		Jnit Risk	Cancer Risk		e Concentration		D/RIC	Hazard Quotier
						Value	Units	Value	Units		Vatue	Units	Value	Units	L
Exposure Medium Total	Former Bullding 234	Ingestion	Benzo(a)anthracene	0.324	mg/kg	1.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.3E-08	6.1E-08	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium Total			Benzo(a)pyrene	0.288	mg/kg	1.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.1E-07	5.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium Total			Benzo(b)fluoranthene	0.477	mg/kg	2.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.9E-08	9.0E-08	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium Total			Chrysene	0.409	mg/kg	2.2E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.6E-10	7.7E-08	(mg/kg/day)	NA	(mg/kg/day)	**
Exposure Medium Total			Dibenzo(a,h)anthracene	0.062	mg/kg	3.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	2.4E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium Total			Indeno(1,2,3-cd)pyrene	0.180	mg/kg	9.7E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	7.1E-09	3.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium Total			Arsenic	17.9	mg/kg	9.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.4E-06	3.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
Exposure Medium ⊤otal Air		1	Beryllium	3.20	mg/kg	1.7E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		6.0E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0003
Exposure Medium Total			Cadmium	13.0	mg/kg	7.0E-07	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		2.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.005
Exposure Medium Total			Chromium VI	83.0	mg/kg	4.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	2.2E-06	1.6E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
Exposure Medium ⊤otal Air			Cobalt	20.0	mg/kg	1.1E-06	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
Exposure Medium Total			Iron	32,100	mg/kg	1.7E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		6.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.009
Exposure Medium Total Air			Lead	54	mg/kg	2.9E-06	(mg/kg/day)	NA	(mg/kg/day)	• •	1.0E-05	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium Total			Manganese	509.0	mg/kg	2.7E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		9.6E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.004
Exposure Medium Total		Exp. Route Total								3.8E-06	<u> </u>				0.05
Exposure Medium Total Air		Dermal	Benzo(a)anthracene	0.324	mg/kg	9.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) 1	6.6E-09	3.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium Total Air		1	Benzo(a)pyrene	0.288	mg/kg	8.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	5.9E-08	2.8E-08	(mg/kg/day)	NA	(mg/kg/day)	i
Exposure Medium ⊤otal Air		1	Benzo(b)fluoranthene	0.477	mg/kg	1.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	9.7E-09	4.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium Total Air			Chrysene	0.409	mg/kg	1.1E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	8.3E-11	4.0E-08	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium Total Air			Dibenzo(a,h)anthracene	0.062	mg/kg	1.7E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.3E-08	6.0E-09	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium ⊤otal Air			Indeno(1,2,3-cd)pyrene	0.180	mg/kg	5.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.7E-09	1.8E-08	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium Total			Arsenic	17.9	mg/kg	1.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day).1	1.7E-07	4.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001
Exposure Medium Total			Beryllium	3.20	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	
Exposure Medium Total		į.	Cadmium	13.0	mg/kg	2.8E-09	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		9.7E-09	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0004
Exposure Medium Total			Chromium VI	83.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	-
Exposure Medium Total			Cobalt	20.0	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	-
Exposure Medium Total Air		ļ	Iron	32,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
Exposure Medium ⊤otal Air		1	Lead	54	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	
Exposure Medium Total Air			Manganese	509.0	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
Exposure Medium Total Air		Exp. Route Total								2.6E-07					0.002
Exposure Medium Total Air	Exposure Point Total									4.1E-06					0.05
Air	<u> </u>									4.1E-06					0.05
	Former Building 234	Inhalation	Benzo(a)anthracene	2.9E-11	mg/m³	1.8E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.0E-14	6.5E-13	(mg/m <sup>3</sup> )	NA	(mg/m³)	
	· ·	t	Benzo(a)pyrene	2.6E-11	mg/m³	1.6E-13	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.8E-13	5.7E-13	(mg/m <sup>3</sup> )	NA	(mg/m³)	
			Benzo(b)fluoranthene	4.3E-11	mg/m <sup>3</sup>	2.7E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.0E-14	9.5E-13	(mg/m³)	NA	(mg/m <sup>3</sup> )	
		1	Chrysene	3.7E-11	mg/m³	2.3E-13	(mg/m³)	1.1E-05	(ug/m³) <sup>-1</sup>	2.6E-15	8.1E-13	(mg/m³)	NA	(mg/m <sup>3</sup> )	
			Dibenzo(a,h)anthracene	5.6E-12	mg/m³	3.5E-14	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	4.2E-14	1.2E-13	(mg/m³)	NA	(mg/m³)	
	1		indeno(1,2,3-cd)pyrene	1.6E-11	mg/m³	1.0E-13	(mg/m³)	1.1E-04	{ug/m³}-1	1.1E-14	3.6E-13	(mg/m <sup>3</sup> )	NA	(mg/m³)	
	1	1	Arsenic	1.6E-9	mg/m³	1.0E-11	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ).1	4.4E-11	3.6E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000002
			Beryllium	2.9E-10	mg/m³	1.8E-12	(mg/m <sup>3</sup> )	2.4E-03	(ug/m³) <sup>-1</sup>	4.4E-12	6.4E-12	(mg/m³)	2.0E-05	(mg/m³)	3.2E-7
			Cadmium	1.2E-9	mg/m³	7.4E-12	(mg/m <sup>3</sup> )	1.8E-03	(ug/m <sup>3</sup> )-1	1.3E-11	2.6E-11	(mg/m³)	2.0E-05	(mg/m³)	0.000001
			Chromium VI	7.5E-9	mg/m <sup>3</sup>	4.7E-11	(mg/m <sup>3</sup> )	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	4.0E-09	1.7E-10	(mg/m <sup>3</sup> )	1.0E-04	(mg/m <sup>3</sup> )	0.000002
	1		Cobalt	1.8E-9	mg/m³	1.1E-11	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.0E-10	4.0E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000007
	1		Iron	2.9E-6	mg/m³	1.8E-08	(mg/m <sup>3</sup> )	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>	1	6.4E-08	(mg/m³)	NA	(mg/m³)	
			Lead	4.6E-8	mg/m <sup>3</sup>	2.9E-10	(mg/m³)	NA.	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.0E-09	(mg/m³)	NA	(mg/m³)	
	1		Manganese	4.6E-8	mg/m³	2.9E-10	(mg/m³)	NA.	(ug/m <sup>3</sup> )-1		1.0E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00002
		Exp. Route Total	1	•		1				4.1E-09	1				0.00003
	Exposure Point Total		I			1				4.1E-09					0.00003
Exposure Medium Total						1				4.1E-09	i				0.00003
Medium Total			***************************************						<del></del>	4.1E-06					0.05

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.3.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current

Receptor Population: Industrial Workers

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC			ncer Risk Calcula	itions				ncer Hazard C		
			i	Potential Concern	Value	Units		e Concentration		Jnit Risk	Cancer Risk		e Concentration		D/RfC	Hazard Quoti
							Value	Units	Value	Units	<u> </u>	Value	Units	Value	Units	
ce Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.324	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	8.3E-08	3.2E-07	(mg/kg/day)	NA	(mg/kg/day)	
	į		1	Benzo(a)pyrene	0.288	mg/kg	1.0E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	7.3E-07	2.8E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.477	mg/kg	1.7E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) 1	1.2E-07	4.7E-07	(mg/kg/day)	NA	(mg/kg/day)	
		1		Chrysene	0.409	mg/kg	1.4E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.0E-09	4.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.062	mg/kg	2.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.6E-07	6.1E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	6.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	4.6E-08	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	1
				Arsenic	17.9	mg/kg	6.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	9.4E-06	1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06
	ı			Beryllium	3.20	mg/kg	1.1E-06	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		3.1E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.002
	1			Cadmium	13.0	mg/kg	4.5E-06	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		1.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.03
			1	Chromium VI	83.0	mg/kg	2.9E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	1.5E-05	8.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.03
				Cobalt	20.0	mg/kg	7.0E-06	(mg/kg/day)	NA.	(mg/kg/day)		2.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07
	j			Iron	32,100	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
	}			Lead	54	mg/kg	1.9E-05	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		5.3E-05	(mg/kg/day)	NA	(mg/kg/day)	
	}			Manganese	509.0	mg/kg	1.8E-04	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		5.0E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
	)		Exp. Route Total	1				1 1 0 0 37		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	2.5E-05	i				0.2
	ŀ	i	Dermal	Benzo(a)anthracene	0.324	mg/kg	9.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	7.1E-08	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	
	l.		Deimai	Benzo(a)pyrene	0.288	mg/kg	8.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	6.3E-07	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.477	mg/kg	1.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.0E-07	4.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.409	mg/kg	1.2E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	9.0E-10	3.4E-07	(mg/kg/day)	NA	(mg/kg/day)	I
				Dibenzo(a,h)anthracene	0.062	mg/kg	1.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.4E-07	5.2E-08	(mg/kg/day)	NA.	(mg/kg/day)	1
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	5.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.9E-08	1.5E-07	(mg/kg/day)	NA.	(mg/kg/day)	l
	ľ			Arsenic	17.9	mg/kg	1.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.9E-06	3.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Beryllium	3.20	ma/ka	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1	1.52-00	0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	
		1		· '		1 "	3.0E-08		NA NA			8.4E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.00
				Cadmium	13.0	mg/kg	II.	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.4E-00	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.00
				Chromium VI	83.0	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	-
		1		Cobalt	20.0	mg/kg	0.0E+00	(mg/kg/day)		(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Iron	32,100	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)		0.0E+00		NA		
				Lead	54	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day) (mg/kg/day)	-
		1		Manganese	509.0	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total	<u></u>							2.8E-06	ļ				0.01
		Exposure Point Total									2.8E-05					0.3
	Exposure Medium Total						<u> </u>				2.8E-05					0.3
	Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.9E-11	mg/m <sup>3</sup>	2.4E-12	(mg/m³)	1.1E-04	(ug/m³)-1	2.6E-13	6.7E-12	(mg/m³)	NA	(mg/m³)	
				Benzo(a)pyrene	2.6E-11	mg/m <sup>3</sup>	2.1E-12	(mg/m <sup>3</sup> )	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.3E-12	6.0E-12	(mg/m³)	NA	(mg/m <sup>3</sup> )	
		1		Benzo(b)fluoranthene	4.3E-11	mg/m <sup>3</sup>	3.5E-12	(mg/m³)	1.1E-04	(ug/m³) <sup>-1</sup>	3.9E-13	9.9E-12	(mg/m³)	NA	(mg/m³)	
			İ	Chrysene	3.7E-11	mg/m³	3.0E-12	(mg/m³)	1.1E-05	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.3E-14	8.5E-12	(mg/m³)	NA	(mg/m³)	-
				Dibenzo(a,h)anthracene	5.6E-12	mg/m <sup>3</sup>	4.6E-13	(mg/m³)	1.2E-03	(ug/m³)-1	5.5E-13	1.3E-12	(mg/m³)	NA	(mg/m³)	- "
	}			Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m <sup>3</sup>	1.3E-12	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.5E-13	3.7E-12	(mg/m³)	NA	(mg/m³)	-
	1		1	Arsenic	1.6E-9	mg/m <sup>3</sup>	1.3E-10	(mg/m³)	4.3E-03	(ug/m³) <sup>-1</sup>	5.7E-10	3.7E-10	(mg/m³)	1.5E-05	(mg/m <sup>3</sup> )	0.000
				Beryllium	2.9E-10	mg/m <sup>3</sup>	2.4E-11	(mg/m³)	2.4E-03	(ug/m <sup>3</sup> )-1	5.7E-11	6.6E-11	(mg/m³)	2.0E-05	(mg/m³)	0.000
				Cadmium	1.2E-9	mg/m <sup>3</sup>	9.6E-11	(mg/m³)	1.8E-03	(ug/m <sup>3</sup> )-1	1.7E-10	2.7E-10	(mg/m³)	2.0E-05	(mg/m³)	0.000
		1		Chromium VI	7.5E-9	mg/m <sup>3</sup>	6.2E-10	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	5.2E-08	1.7E-09	(mg/m³)	1.0E-04	(mg/m³)	0.000
				Cobalt	1.8E-9	mg/m <sup>3</sup>	1.5E-10	(mg/m <sup>3</sup> )	9.0E-03	(ug/m <sup>3</sup> )-1	1.3E-09	4.2E-10	(mg/m³)	6.0E-06	(mg/m³)	0.000
				Iron	2.9E-6	mg/m³	2.4E-07	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		6.7E-07	(mg/m³)	NA	(mg/m³)	
			1	Lead	4.9E-9	mg/m <sup>3</sup>	4.0E-10	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		1.1E-09	(mg/m³)	NA	(mg/m³)	-
				Manganese	4.6E-8	mg/m <sup>3</sup>	3.8E-09	(mg/m³)	NA.	(ug/m <sup>3</sup> )-1		1.1E-08	(mg/m³)	5.0E-05	(mg/m³)	0.00
			Exp. Route Total	<u> </u>			1		•		5.4E-08	1	<del></del>	•	<u> </u>	0.00
		Exposure Point Total		J.,			1				5.4E-08					0.00
	Commence Manager Trans	Exposure Form Total		<del></del>			<del></del>				5.4E-08	1				0.00
	Exposure Medium Total						ļ				2.8E-05	<del> </del>				0.00
Medium Total																

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.4 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	Ċ		Car	cer Risk Calcula	tions		}	Non-Ca	ncer Hazard C	alculations	
	,	'	1	Potential Concern	Value	Units	Intake/Exposul	e Concentration	CSF/L	Init Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
							Value	Units	Value	Units	1	Value	Units	Value	Units	i
Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.300	mg/kg	3.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) 1	2.5E-08	7.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.270	mg/kg	3.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	2.2E-07	7.1E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.430	mg/kg	4.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	3.5E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
	1			Chrysene	0.360	mg/kg	4.1E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	3.0E-10	9.5E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.062	mg/kg	7.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	5.1E-08	1.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	2.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.5E-08	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)	
	1	ļ		Arsenic	16.4	mg/kg	6.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	9.2E-07	4.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
		!		Beryllium	3.50	mg/kg	1.3E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		9.2E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0005
		1		Cadmium	13.0	mg/kg	4.9E-07	(mg/kg/day)	NA	(mg/kg/day) '		3.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.007
				Chromium VI	91.1	mg/kg	1.0E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	5.1E-06	2.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.008
				Cobalt	17.8	mg/kg	6.7E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
			}	Iron	30,020	mg/kg	- 1.1E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		7.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
				Lead	53.6	mg/kg	2.0E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.4E-05	(mg/kg/day)	NA	(mg/kg/day)	
			1	Manganese	474	mg/kg	1.8E-05	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		1.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005
			Exp. Route Total	1							6.4E-06	1		-		0.06
			Dermal	Benzo(a)anthracene	0.300	mg/kg	9.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	7.1E-08	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	
		1	F	Benzo(a)pyrene	0.270	mg/kg	8.7E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)	6.4E-07	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
		1		Benzo(b)fluoranthene	0.430	mg/kg	1.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.0E-07	3.2E-07	(mg/kg/day)	NA	(mg/kg/day)	
		1		Chrysene	0.360	mg/kg	1.2E-07	(mg/kg/day)	7.3E-03	(mg/kg/day)-1	8.5E-10	2.7E-07	(mg/kg/day)	NA.	(mg/kg/day)	
		1		Dibenzo(a,h)anthracene	0.062	mg/kg	2.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)	1.5E-07	4.7E-08	(mg/kg/day)	NA.	(mg/kg/day)	
		i		Indeno(1,2,3-cd)pyrene	0.180	ma/ka	5.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.2E-08	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Arsenic	16.4	mg/kg	4.1E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	6.1E-07	2.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009
				Beryllium	3.50	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	
				Cadmium	13.0	mg/kg	1.1E-08	(mg/kg/day)	NA	(mg/kg/day)-1		7.5E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.003
				Chromlum VI	91.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	17.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
		1		Iron	30,020	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
		ļ.		Lead	53.6	ma/ka	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)	
		İ		Manganese	474	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total	1						1	1.6E-06	1		•		0.01
		Exposure Point Total	1		<del></del>						8.0E-06			****		0.07
	Exposure Medium Total	C. Goddie i em i etta									8.0E-06			••••		0.07
	Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	2.6E-13	(mg/m <sup>3</sup> )	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.8E-14	6.0E-13	(mg/m³)	I NA	(mg/m³)	
	[ ···	. Simon Sanoning EST	11773441017	Benzo(a)pyrene	2.5E-11	mg/m <sup>3</sup>	2.3E-13	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> )-1	2.5E-13	5.4E-13	(mg/m³)	NA.	(mg/m³)	
				Benzo(b)fluoranthene	3.9E-11	mg/m³	3.7E-13	(mg/m³)	1.1E-04	(ug/m³)-1	4.0E-14	8.6E-13	(mg/m³)	NA NA	(mg/m³)	
		l		Chrysene	3.3E-11	mg/m <sup>3</sup>	3.1E-13	(mg/m <sup>3</sup> )	1.1E-05	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.4E-15	7.2E-13	(mg/m³)	NA NA	(mg/m³)	
				Dibenzo(a,h)anthracene	5.6E-12	mg/m³	5.3E-14	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.4E-14	1.2E-13	(mg/m³)	NA NA	(mg/m³)	·
				Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m³	1.5E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	1.7E-14	3.6E-13	(mg/m³)	NA NA	(mg/m³)	
				Arsenic	1.5E-9	mg/m³	4.7E-12	(mg/m <sup>3</sup> )	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.0E-11	3.3E-11	(mg/m³)	1.5E-05	(mg/m <sup>3</sup> )	0.000002
			Į.	Beryllium	3.2E-10	mg/m <sup>3</sup>	1.0E-12	(mg/m³)	2.4E-03	(ug/m³)-1	2.4E-12	7.0E-12	(mg/m³)	2.0E-05	(mg/m³)	3.5E-7
			1	Cadmium	1.2E-9	mg/m <sup>3</sup>	3.7E-12	(mg/m <sup>3</sup> )	1.8E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.7E-12	2.6E-11	(mg/m³)	2.0E-05	(mg/m³)	0.000001
				Chromium VI	8.3E-9	mg/m <sup>3</sup>	7.8E-11	(mg/m <sup>-</sup> ) (mg/m <sup>3</sup> )	8.4E-02	(ug/m²)-1	6.5E-09	1.8E-10	(mg/m <sup>-</sup> )	1.0E-04	(mg/m <sup>3</sup> )	0.000001
				Cobalt	1.6E-9	1 " -	5.1E-12	(mg/m <sup>-</sup> ) (mg/m <sup>3</sup> )	9.0E-03	(ug/m²) 1 (ug/m³)-1	4.6E-11	3.5E-11	(mg/m³)	6.0E-06	(mg/m ) (mg/m³)	0.000002
			i	Iron	2.7E-6	mg/m <sup>3</sup>	8.5E-09	(mg/m <sup>-</sup> ) (mg/m <sup>3</sup> )	9.0E-03	(ug/m²) -1	4.65-11	6.0E-08	(mg/m³)	NA	(mg/m )	0.000006
				Lead	4.9E-9	ı .	1.5E-11	1	NA NA	(ug/m <sup>3</sup> )-1		1.1E-10	(mg/m <sup>3</sup> )	NA NA	(mg/m²)	1
		1		1		mg/m <sup>3</sup>	II .	(mg/m³)				11	1	1		0.00002
			F 5	Manganese	4.3E-8	mg/m³	1.3E-10	(mg/m³)	NA .	(ug/m³)-1	<del> </del>	9.4E-10	(mg/m³)	5.0E-05	(mg/m³)	
			Exp. Route Total				<u> </u>				6.6E-09	<b> </b>				0.00003
		Exposure Point Total					<u> </u>				6.6E-09	ļ				0.00003
	Exposure Medium Total			······································							6.6E-09		••••			0.00003
um Total											8.0E-06					0.07

#### TABLE 7.4.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timetrame: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	
	1		]	Potential Concern	Value	Units	Intake/Exposul	e Concentration	CSF/L	Jnit Risk	Cancer Risk	fntake/Exposu	re Concentration	Rf	D/RfC	Hezard Quotier
			1				Value	Units	Value	Units		Value	Units	Value	Units	1
ubsurface Soil	Subsurface Soil	Former Building 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	6.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	4.5E-08	1.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Aluminum	12,600	mg/kg	4.7E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
				Arsenic	23.3	mg/kg	8.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.3E-06	6.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Chromium VI	25.4	mg/kg	2.9E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	1.4E-06	6.7E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
				Cobalt	13.3	mg/kg	5.0E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Iron	31,600	mg/kg	1.2E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		8.3E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
				Manganese	684	mg/kg	2.6E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.8E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.007
			Exp. Route Total								2.8E-06	li				0.06
			Dermal	Benzo(a)pyrene	0.055	mg/kg	1.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.3E-07	4.1E-08	(mg/kg/day)	NA	(mg/kg/day)	
			i	Aluminum	12,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	23.3	mg/kg	5.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	8.7E-07	4.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	-
				Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	31,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	i
				Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total								1.0E-06					0.01
		Exposure Point Total									3.8E-06	l				0.07
	Exposure Medium Total										3.8E-06					0.07
	. Air	Former Building 234	Inhalation	Benzo(a)pyrene	5.0E-12	mg/m <sup>3</sup>	4.7E-14	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	5.2E-14	1.1E-13	(mg/m³)	NA	(mg/m³)	
				Aluminum	1.1E-6	mg/m³	3.6E-09	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.5E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000005
				Arsenic	2.1E-9	mg/m <sup>3</sup>	6.6E-12	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.9E-11	4.6E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003
	{			Chromium VI	2.3E-9	rng/m³	2.2E-11	(mg/m³)	8.4E-02	(ug/m³) <sup>-1</sup>	1.8E-09	5.1E-11	(mg/m³)	1.0E-04	(mg/m³)	5.1E-7
				Cobalt	1.2E-9	mg/m³	3.8E-12	(mg/m³)	9.0E-03	(ug/m³) <sup>-1</sup>	3.4E-11	2.7E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000004
	}			iron	2.9E-6	mg/m <sup>3</sup>	9.0E-09	(mg/m <sup>3</sup> )	NA	(ug/m³) <sup>-1</sup>		6.3E-08	(mg/m <sup>3</sup> )	NA	(mg/m³)	
	}		<u></u>	Manganese	6.2E-8	mg/m³	1.9E-10	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.4E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00003
	ł		Exp. Route Total								1.9E-09	l				0.00004
		Exposure Point Total			•	• • • • • • • • • • • • • • • • • • • •					1.9E-09					0.00004
	Exposure Medium Total										1.9E-09					0.00004
Medium Totai										_	3.8E-06					0.07

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 7.5.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, HRODE ISLAND
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Scenario Timetrame: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	tions			Non-Ce	ncer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Risk	Cancer Risk		re Concentration		D/RfC	Hazard Quotle
					1		Value	Units	Value	Units	<u> </u>	Value	Units	Value	Units	<u> </u>
face Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.2E-08	5.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
	ì		1	Benzo(a)pyrene	0.270	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.1E-07	5.1E-08	(mg/kg/day)	NA NA	(mg/kg/day)	-
				Benzo(b)fluoranthene	0.430	mg/kg	2.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	1.7E-08	8.1E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
		}		Chrysene	0.360	mg/kg	1.9E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.4E-10	6.8E-08	(mg/kg/day)	NA.	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.062	mg/kg	3.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day).1	2.4E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	9.7E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) 1	7.1E-09	3.4E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
	Į.			Arsenic	16.4	mg/kg	8.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) 1	1.3E-06	3.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
	ł			Beryllium	3.50	mg/kg	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)-1		6.6E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0003
				Cadmium	13.0	mg/kg	7.0E-07	(mg/kg/day)	NA NA	(mg/kg/day) 1		2.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.005
				Chromium VI	91.1	mg/kg	4.9E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)	2.4E-06	1.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006
			1	Cobalt	17.8	mg/kg	9.6E-07	(mg/kg/day)	NA	(mg/kg/day)		3.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Iron	30,020	mg/kg	1.6E-03	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		5.6E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.008
				Lead	53.6	mg/kg	2.9E-06	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.0E-05	(mg/kg/day)	NA.	(mg/kg/day)	
	ı			Manganese	474	mg/kg	2.5E-05	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		8.9E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.004
	1		Exp. Route Total	1				1 ( 3 3 7/		1 ( 3 3 - 1)	3.9E-06	i				0.04
			Dermal	Benzo(a)anthracene	0.300	mg/kg	8.4E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6,1E-09	2.9E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
	1		Dernial	Benzo(a)pyrene	0.300	mg/kg mg/kg	7.5E-09	(mg/kg/day) (mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	5.5E-08	2.6E-08	(mg/kg/day)	NA NA	(mg/kg/day) (mg/kg/day)	"
	!				0.430		1.2E-08	(mg/kg/day)	7.3E+00 7.3E-01		8.7E-09	4.2E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
	1			Benzo(b)fluoranthene	1	mg/kg	1.0E-08	(mg/kg/day)	7.3E-01 7.3E-03	(mg/kg/day)	7.3E-11	3.5E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Chrysene	0.360	mg/kg mg/kg	1.7E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)	1.3E-08	6.0E-09	(mg/kg/day)	NA NA	(mg/kg/day)	
	{			Dibenzo(a,h)anthracene	1		5.0E-09		7.3E+00 7.3E-01	(mg/kg/day)	3.7E-09	1.8E-08	(mg/kg/day) (mg/kg/day)	NA NA	(mg/kg/day) (mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.180 16.4	mg/kg	1.1E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	1.6E-07	3.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day) (mg/kg/day)	0.001
				Arsenic	3.50	mg/kg	0.0E+00	(mg/kg/day)	1.5E+00	(mg/kg/day)	1.62-07	0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day) (mg/kg/day)	0.001
				Beryllium	1	mg/kg	2.8E-09	(mg/kg/day)	NA NA	(mg/kg/day)		9.7E-09	(mg/kg/day)	2.5E-05	(mg/kg/day) (mg/kg/day)	0.0004
	i		1	Cadmium	13.0	mg/kg		(mg/kg/day)		(mg/kg/day)		0.0E+00		7.5E-05	(mg/kg/day)	0.0004
			1	Chromium VI	91.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)		g .	(mg/kg/day)	7.5E-05 3.0E-04	1	
			1	Cobalt	17.8	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-04	(mg/kg/day)	
				iron	30,020	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)		(mg/kg/day)	
				Lead	53.6	mg/kg	0.0E+00	(mg/kg/day)	NA 	(mg/kg/day)		0.0E+00	(mg/kg/day)	NA 0.05.04	(mg/kg/day)	
				Manganese	474	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	<del></del>
			Exp. Route Total	<u> </u>							2.4E-07	<u></u>				0.002
		Exposure Point Total									4.2E-06					0.05
	Exposure Medium Total										4.2E-06	l				0.05
	Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	1.7E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	1.9E-14	6.0E-13	(mg/m³)	NA	(mg/m³)	
				Benzo(a)pyrene	2.5E-11	mg/m³	1.5E-13	(mg/m³)	1.1E-03	(ug/m³)-1	1.7E-13	5.4E-13	(mg/m³)	NA NA	(mg/m³)	-
	1			Benzo(b)fluoranthene	3.9E-11	mg/m³	2.4E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	2.7E-14	8.6E-13	(mg/m³)	NA	(mg/m³)	
				Chrysene	3.3E-11	mg/m³	2.0E-13	(mg/m <sup>3</sup> )	1,1E-05	(ug/m³) <sup>-1</sup>	2.3E-15	7.2E-13	(mg/m³)	NA.	(mg/m³)	
			1	Dibenzo(a,h)anthracene	5.6E-12	mg/m³	3.5E-14	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> )-1	4.2E-14	1.2E-13	(mg/m³)	NA	(mg/m³)	-
				Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m³	1.0E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.1E-14	3.6E-13	(mg/m³)	NA.	(mg/m³)	
	\ \			Arsenic	1.5E-9	mg/m³	9.3E-12	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> )-1	4.0E-11	3.3E-11	(mg/m³)	1.5E-05	(mg/m³)	0.00000
	i			Beryllium	3.2E-10	mg/m <sup>a</sup>	2.0E-12	(mg/m³)	2.4E-03	(ug/m <sup>3</sup> )-1	4.8E-12	7.0E-12	(mg/m³)	2.0E-05	(mg/m³)	3.5E-7
			1	Cadmium	1.2E-9	mg/m <sup>3</sup>	7.4E-12	(mg/m³)	1.8E-03	(ug/m³)-1	1.3E-11	2.6E-11	(mg/m³)	2.0E-05	(mg/m <sup>3</sup> )	0.00000
	Į.		1	Chromium VI	8.3E-9	mg/m <sup>3</sup>	5.2E-11	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> )-1	4.4E-09	1.8E-10	(mg/m³)	1.0E-04	(mg/m <sup>3</sup> )	0.00000
	[		1	Cobalt	1.6E-9	mg/m <sup>3</sup>	1.0E-11	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> )-1	9.1E-11	3.5E-11	(mg/m³)	6.0E-06	(mg/m³)	0.00000
	j		1	iron	2.7E-6	mg/m <sup>3</sup>	1.7E-08	(mg/m³)	NA NA	(ug/m <sup>3</sup> )-1		6.0E-08	(mg/m³)	NA.	(mg/m³)	
	}	}	1	Lead	4.9E-9	mg/m³	3.1E-11	(mg/m³)	NA	(ug/m³)-1		1.1E-10	(mg/m³)	NA.	(mg/m³)	
	}		1	Manganese	4.9E-9 4.3E-8	mg/m mg/m <sup>3</sup>	2.7E-10	(mg/m³)	NA NA	(ug/m³)-1		9.4E-10	(mg/m³)	5.0E-05	(mg/m³)	0.0000
	)		For Davida Title	Iwanganese	4.35-6	i my/m	2.72-10	(mg/m)	1 170	(ug/iii /	4.5E-09	1-0.72:10	1 (my/m/)	5.52.55	1 (119/111)	0.0000
	)		Exp. Route Total	<u> </u>			ļ									
		Exposure Point Total					<u> </u>				4.5E-09	ļ				0.00003
	Exposure Medium Total										4.5E-09					0.00003
Medium Total											4.2E-06	1				0.05

# TABLE 7.5.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/I	Jnit Risk	Cancer Risk	Intake/Exposu	e Concentration	Rf	D/RfC	Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	1
Subsurtace Soil	Subsurface Soil	Former Bullding 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	3.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	2.2E-08	1.0E-0B	(mg/kg/day)	NA	(mg/kg/day)	
			1	Aluminum	12,600	mg/kg	6.8E-04	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		2.4E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
			ł	Arsenic	23.3	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.9E-06	4.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	25.4	mg/kg	1.4E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	6.8E-07	4.8E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
				Cobalt	13.3	mg/kg	7.1E-07	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		2.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.008
	1			Iron	31,600	mg/kg	1.7E-03	(mg/kg/day)	NA NA	(mg/kg/day)-1		5.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.008
				Manganese	684	mg/kg	3.7E-05	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005
		1	Exp. Route Total								2.6E-06					0.04
	i	1	Dermai	Benzo(a)pyrene	0.055	mg/kg	1.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.1E-08	5.4E-09	(mg/kg/day)	NA	(mg/kg/day)	
	1	}	1	Aluminum	12,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
	1		1	Arsenic	23.3	mg/kg	1.5E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) 1	2.2E-07	5.2E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
		İ	]	Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
	1	1	1	Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	-
	1		1	Iron	31,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
		1		Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total								2.4E-07					0.002
		Exposure Point Total									2.8E-06					0.04
	Exposure Medium Total										2.8E-06					0.04
	Air	Former Building 234	Inhalation	Benzo(a)pyrene	5.0E-12	mg/m³	3.1E-14	(mg/m <sup>3</sup> )	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.4E-14	1.1E-13	(mg/m³)	NA	(mg/m³)	
	1			Aluminum	1.1E-6	mg/m³	7.2E-09	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.5E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000005
			1	Arsenic	2.1E-9	mg/m³	1.3E-11	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	5.7E-11	4.6E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003
				Chromium VI	2.3E-9	mg/m³	1.4E-11	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.2E-09	5.1E-11	(mg/m <sup>3</sup> )	1.0E-04	(mg/m³)	5.1E-7
				Cobalt	1.2E-9	mg/m³	7.6E-12	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.8E-11	2.7E-11	(mg/m <sup>3</sup> )	6.0E-06	(mg/m³)	0.000004
				Iron	2.9E-6	mg/m³	1.8E-08	(mg/m³)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		6.3E-08	(mg/m <sup>3</sup> )	NA	(mg/m³)	
		1		Manganese	6.2E-8	mg/m <sup>3</sup>	3.9E-10	(mg/m³)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.4E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00003
			Exp. Route Total	l							1.3E-09	ļ				0.00004
		Exposure Point Total									1.3E-09					0.00004
	Exposure Medium Total										1.3E-09					0.00004
Medium Total											2.8E-06					0.04

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidence for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.6.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Current/Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	T	Ca	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	<u> </u>
	}	İ		Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnlt Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf.	D/RfC	Hazard Quotlent
	<b></b>						Value	Units	Value	Units	1	Value	Units	Value	Units	
Surface Soil	Surface Soll	Former Building 234	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)	7.7E-08	2.9E-07	(mg/kg/day)	NA .	(mg/kg/day)	
				Benzo(a)pyrene	0.270	mg/kg	9.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	6.9E-07	2.6E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.430	mg/kg	1.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.1E-07	4.2E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
				Chrysene	0.360	mg/kg	1.3E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	9.2E-10	3.5E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.062	mg/kg	2.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.6E-07	6.1E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indenc(1,2,3-cd)pyrene	0.180	mg/kg	6.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.6E-08	1.8E-07	(mg/kg/day)	NA.	(mg/kg/day)	
		}		Arsenic	16.4	mg/kg	5.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	8.6E-06	1.6E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.05
		}		Beryllium	3.50	mg/kg	1.2E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.4E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.002
	}		ļ	Cadmium	13.0	mg/kg	4.5E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.03
	ł			Chromium VI	91.1	mg/kg	3.2E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	1.6E-05	8.9E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.03
			1	Cobalt	17.8	mg/kg	6.2E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06
				Iron	30,020	mg/kg	1.0E-02	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		2.9E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
				Lead	53.6	mg/kg	1.9E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		5.2E-05	(mg/kg/day)	NA	(mg/kg/day)	
	1		1	Manganese	474	mg/kg	1.7E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.6E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
			Exp. Route Total								2.6E-05					0.2
			Dermal	Benzo(a)anthracene	0.300	mg/kg	9.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6.6E-08	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
	1	ĺ	ł	Benzo(a)pyrene	0.270	mg/kg	8.1E-08	(mg/kg/day)	7.3É+00	(mg/kg/day) <sup>-1</sup>	5.9E-07	2.3E-07	(mg/kg/day)	NA.	(mg/kg/day)	
		}	i	Benzo(b)fluoranthene	0.430	mg/kg	1.3Ë-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	9.4E-08	3.6E-07	(mg/kg/day)	NA	(mg/kg/day)	
		ł	1	Chrysene	0.360	mg/kg	1.1E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	7.9E-10	3.0E-07	(mg/kg/day)	NA.	(mg/kg/day)	
			1	Dibenzo(a,h)anthracene	0.062	mg/kg	1.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.4E-07	5.2E-08	(mg/kg/day)	NA.	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	5.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.9E-08	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
		ł		Arsenic	16.4	mg/kg	1.1E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.7E-06	3.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
			i	Beryllium	3.50	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	
			i	Cadmium	13.0	mg/kg	3.0E-08	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>	1	8.4E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.003
				Chromium VI	91.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	17.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	30,020	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Lead	53.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	
		}		Manganese	474	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
		<u> </u>	Exp. Route Total								2.6E-06					0.01
		Exposure Point Total									2.8E-05					0.2
	Exposure Medium Total						1				2.8E-05					0.2
	Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	2.2E-12	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.4E-13	6.2E-12	(mg/m³)	NA	(mg/m³)	
		1		Benzo(a)pyrene	2.5E-11	mg/m³	2.0E-12	(mg/m³)	1.1E-03	(ug/m³) <sup>-1</sup>	2.2E-12	5.6E-12	(mg/m³)	NA	(mg/m³)	
		1		Benzo(b)fluoranthene	3.9E-11	mg/m³	3.2E-12	(mg/m <sup>3</sup> )	1.1E-04	(ug/m <sup>3</sup> )-1	3.5E-13	8.9E-12	(mg/m³)	NA	(mg/m³)	
		1	i	Chrysene	3.3E-11	mg/m <sup>3</sup>	2.7E-12	(mg/m³)	1.1E-05	(ug/m <sup>3</sup> )-1	2.9E-14	7.5E-12	(mg/m³)	NA NA	(mg/m³)	
		1		Dibenzo(a,h)anthracene	5.6E-12	mg/m <sup>3</sup>	4.6E-13	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> )-1	5.5E-13	1.3E-12	(mg/m³)	NA	(mg/m³)	
		1		Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m <sup>3</sup>	1.3E-12	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.5E-13	3.7E-12	(mg/m³)	NA	(mg/m³)	
		1		Arsenic	1.5E-9	mg/m <sup>3</sup>	1.2E-10	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> )-1	5.2E-10	3.4E-10	(mg/m <sup>3</sup> )	1.5E-05	(mg/m³)	0.00002
	1	1	1	I	0.05.40	1 -	0.05.44	1	1 045 00	31	0.05.44	7.05.44	1 4	1 225 25	1	0.000004

2.6E-11

9.6E-11

6.8E-10

1.3E-10

2.2E-07

4.0E-10

3.5E-09

(mg/m<sup>3</sup>)

(mg/m³)

(mg/m³)

(mg/m³)

(mg/m<sup>3</sup>)

(mg/m³)

(mg/m³)

2.4E-03

1.8E-03

8.4E-02

9.0E-03

NA

NA

NA

(ug/m<sup>3</sup>)-1

(ug/m<sup>3</sup>)-1

(ug/m<sup>3</sup>)<sup>-1</sup>

(ug/m<sup>3</sup>)<sup>-1</sup>

(ug/m<sup>3</sup>)<sup>-1</sup>

(ug/m<sup>3</sup>)-1

(ug/m<sup>3</sup>)<sup>-1</sup>

6.2E-11

1.7E-10

5.7E-08

1.2E-09

- -

5.9E-08

5.9E-08 5.9E-08

2.8E-05

7.3E-11

2.7E-10

1.9E-09

3.7E-10

6.2E-07

1.1E-09

9.8E-09

(mg/m³)

(mg/m<sup>3</sup>)

(mg/m³)

(mg/m³)

(mg/m³)

(mg/m³)

(mg/m³)

2.0E-05

2.0E-05

1.0E-04

6.0E-06

NA

NA

5.0E-05

(mg/m<sup>3</sup>)

(mg/m³)

(mg/m³)

(mg/m³)

(mg/m³)

(mg/m³)

(mg/m³)

0.000004

0.00001

0.00002

0.00006

0.0002

0.0003

0.0003

0.2

3.2E-10

1.2E-9

8.3E-9

1.6E-9

2.7E-6

4.9E-9

4.3E-8

mg/m³

mg/m<sup>3</sup>

mg/m³

mg/m³

mg/m³

mg/m³

Beryllium

Cadmium

Cobalt

Lead

Iron

Exp. Route Total

Exposure Point Total

Exposure Medium Total

Medium Total

Chromium VI

Manganese

#### TABLE 7.6.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Current/Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	tions			Non-Ca	ncer Hazard Ca	alculations	
				Potential Concern	Value	Units	Intake/Exposur	e Concentration		Jnit R <del>isk</del>	Cancer Risk		e Concentration		D/RfC	Hazard Quotie
							Value	Units	Value	Units		Value	Units	Value	Units	
ubsurface Soil	Subsurface Soil	Former Building 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	1.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.4E-07	5.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
	l			Aluminum	12,600	mg/kg	4.4E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
	<b>t</b>			Arsenic	23.3	mg/kg	8.1E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.2E-05	2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
	1			Chromium VI	25.4	mg/kg	8.9E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	4.4E-06	2.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.008
		1		Cobalt	13.3	mg/kg	4.6E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04
				Iron	31,600	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day)		3.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
			i .	Manganese	684	mg/kg	2.4E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		6.7E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03
			Exp. Route Total	<b>1</b>			i			1 \	1.7E-05	1				0.2
			Dermal	Benzo(a)pyrene	0.055	mg/kg	1,6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day).1	1.2E-07	4.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Aluminum	12,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
		}		Arsenic	23.3	mg/kg	1.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.4E-06	4.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
		İ		Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	31,600	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>	1	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total	I wanganese	004	ilig/kg	0.02+00	(Hig/kg/day/	110	[ (ilig/kg/day)	2.5E-06	0.02700	(mg/ng/day)	0.02 04	(mgmg-day)	0.02
			Exp. House rotal		· · <del></del>		<u> </u>	<del></del>			1.9E-05			·		0.02
		Exposure Point Total					ļ					ļ				
	Exposure Medium Total										1.9E-05					0.2
	Air	Former Building 234	Inhalation	Benzo(a)pyrene	5.0E-12	mg/m <sup>3</sup>	4.1E-13	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> )-1	4.5E-13	1.1E-12	(mg/m³)	NA	(mg/m³)	-
				Aluminum	1.1E-6	mg/m <sup>3</sup>	9.3E-08	(mg/m³)	NA.	(ug/m³) <sup>-1</sup>		2.6E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00005
				Arsenic	2.1E-9	mg/m <sup>3</sup>	1.7E-10	(mg/m³)	4.3E-03	(ug/m³)-1	7.4E-10	4.8E-10	(mg/m³)	1.5E-05	(mg/m³)	0.00003
			1	Chromium VI	2.3E-9	mg/m <sup>3</sup>	1.9E-10	(mg/m³)	8.4E-02	(ug/m³) <sup>-1</sup>	1.6E-08	5.3E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000005
			i	Cobalt	1.2E-9	mg/m³	9.9E-11	(mg/m³)	9.0E-03	(ug/m³)-1	8.9E-10	2.8E-10	(mg/m³)	6.0E-06	(mg/m³)	0.00005
			<b>!</b>	Iron	2.9E-6	mg/m³	2.3E-07	(mg/m³)	NA	(ug/m³)-1		6.6E-07	(mg/m³)	NA	(mg/m³)	-
				Manganese	6.2E-8	mg/m <sup>3</sup>	5.1E-09	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.4E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0003
			Exp. Route Total	]			l				1.7E-08					0.0004
		Exposure Point Total									1.7E-08					0.0004
	Exposure Medium Total										1.7E-08					0.0004
Medium Total					_						1.9E-05					0.2
Groundwater	Groundwater	Former Building 234	Ingestion	cis-1,2-Dichtoroethene	12.7	ug/L	4.4E-05	(mg/kg/day)	NA	(mg/kg/day):1		1.2E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.06
	l	ľ		Trichloroethene	3.90	ug/L	1.4E-05	(mg/kg/day)	4.6E-02	(mg/kg/day) <sup>-1</sup>	6.3E-07	3.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.08
	1	Ì	1	Vinyl Chloride	0.263	ug/L	9.2E-07	(mg/kg/day)	7.2E-01	(mg/kg/day) <sup>-1</sup>	6.6E-07	2.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0009
	1		1	Aluminum	53.7	ug/L	1.9E-04	(mg/kg/day)	NA	(mg/kg/day).1		5.3E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0005
				Arsenic	1.32	ug/L	4.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	6.9E-06	1.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04
				Cobalt	1.74	ug/L	6.1E-06	(mg/kg/day)	NA.	(mg/kg/day)		1.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06
			1	Iron	459	ug/L	1.6E-03	(mg/kg/day)	ı NA	(mg/kg/day) <sup>-1</sup>		4.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.006
				Manganese	532	ug/L	1.9E-03	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		5.2E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.2
			Exp. Route Total	1		-9-		(55))		(ing ing out)	8.2E-06		1 (		(	0.5
			Dermal Dermal	cis-1,2-Dichloroethene	12.7	ug/L	5.2E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>	0.22 00	1.4E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0007
	1		Denna	Trichloroethene	3.90	ug/L	2.1E-07	(mg/kg/day)	4.6E-02		9.8E-09	6.0E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.001
	1				0.263	-	4.4E-09		7.2E-01	(mg/kg/day) <sup>-1</sup>	3.2E-09	1.2E-08		3.0E-03		0.000004
	l l		1	Vinyl Chloride	1	ug/L	B	(mg/kg/day)		(mg/kg/day)	3.22-09	2.4E-07	(mg/kg/day)	1.0E+00	(mg/kg/day)	2.4E-7
	1	ł		Aluminum	53.7	ug/L	8.5E-08	(mg/kg/day)	NA 1.55.00	(mg/kg/day) <sup>-1</sup>	l)		(mg/kg/day)		(mg/kg/day)	1
	(		1	Arsenic	1.32	ug/L	2.1E-09	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.1E-09	5.8E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00002
	(		1	Cobalt	1.74	ug/L	1.1E-09	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.1E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00001
	1	i	1	fron	459	ug/L	7.3E-07	(mg/kg/day)	NA NA	(mg/kg/day)		2.0E-06	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.000
				Manganese	532	ug/L	8.4E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>*1</sup>		2.4E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	
	}		Exp. Route Total	<u> </u>							1.6E-08					0.004
		Exposure Point Total					<u> </u>				8.2E-06					0.5
	Exposure Medium Total										8.2E-06					0.5
											8.2E-06	1				0.5
Medium Total																
Medium Total	·						<del>'</del>	otal Cancer Risk	for Surface Soll	and Groundwater	3.7E-05	Tot	al Hazard Index for	Surface Soil a	nd Groundwater	0.7

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.7.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVISTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 3

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Exposure Medium	Value NA NA NA NA	(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	Hezard Quotient
Surface Soil   Surface Soil   Former Building 234   Ingestion   Benzo(a)anthracene   0.300   mg/kg   7.2E-09   (mg/kg/day)   7.3E-01   (mg/kg/day)   5.3E-09   5.0E-07   (mg/kg/day)   7.3E-00   (mg/kg/day)   7.3E-00   (mg/kg/day)   7.3E-00   (mg/kg/day)   7.3E-00   (mg/kg/day)   7.3E-00   (mg/kg/day)   7.3E-01   (mg	NA NA NA NA	(mg/kg/day) (mg/kg/day) (mg/kg/day)	1 1
Benzo(a)pyrene   0.270   mg/kg   6.5E-09   (mg/kg/dsy)   7.3E-00   (mg/kg/dsy)   4.7E-08   4.5E-07   (mg/kg/ds)	NA NA NA	(mg/kg/day) (mg/kg/day)	1 1
Benzo(a)pyrene   0.270   mg/kg   6.5E-09   (mg/kg/day)   7.3E+00   (mg/kg/day)   4.7E-08   4.5E-07   (mg/kg/day)   7.3E-01	NA NA NA	(mg/kg/day)	
Benzo(b)fluoranthene	NA NA		
Chrysene 0.360 mg/kg 8.6E-09 (mg/kg/day) 7.3E-03 (mg/kg/day) 6.3E-11 6.0E-07 (mg/kg/day)  Dibenzo(a,h)anthracene 0.062 mg/kg 1.5E-09 (mg/kg/day) 7.3E+00 (mg/kg/day) 1.1E-08 1.0E-07 (mg/kg/day)  Indeno(1,2,3-cd)pyrene 0.180 mg/kg 4.3E-09 (mg/kg/day) 7.3E-01 (mg/kg/day) 3.2E-09 3.0E-07 (mg/kg/day)	NA NA	(mg/kg/day)	I 1
Dibenzo(a,h)anithracene	1		1
Indenc(1,2,3-cd)pyrene	1	(mg/kg/day)	
		(mg/kg/day)	1 - 1
Arsenic 16.4 mg/kg (3.9E-07 (mg/kg/day) 1.5E+00 (mg/kg/day) 5.9E-07 (2.8E-05 (mg/kg/day)	1	(mg/kg/day)	0.09
Baryllium 3.50 mg/kg 8.4E-08 (mg/kg/day) NA (mg/kg/day) 5.9E-06 (mg/kg/da)	1	(mg/kg/day)	0.001
Cadmium 13.0 mg/kg 3.1E-07 (mg/kg/day) NA (mg/kg/day) 2.2E-05 (mg/kg/day	1	(mg/kg/day)	0.04
Chromium VI 91.1 mg/kg 2.2E-06 (mg/kg/day) 5.0E-01 (mg/kg/day) 1.1E-06 1.5E-04 (mg/kg/da)	1	(mg/kg/day)	0.008
Cobalt 17.8 mg/kg 4.3E-07 (mg/kg/day) NA (mg/kg/day) 3.0E-05 (mg/kg/day		(mg/kg/day)	0.010
Iron 30,020 mg/kg 7.2E-04 (mg/kg/day) NA (mg/kg/day) - 5.0E-02 (mg/kg/da)	1	(mg/kg/day)	0.07
Lead 53.6 mg/kg 1.3E-06 (mg/kg/day) NA (mg/kg/day) - 9.0E-05 (mg/kg/da)	1	(mg/kg/day)	
Manganese 474 mg/kg 1.1E-05 (mg/kg/day) NA (mg/kg/day) - 8.0E-04 (mg/kg/day)	4	(mg/kg/day)	0.03
Exp. Poule Total 1.8E-06			0.3
Dermal   Benzo(a)anthracene   0.300   mg/kg   2.8E-09   (mg/kg/day)   7.3E-01   (mg/kg/day)   2.0E-09   2.0E-07   (mg/kg/day)	NA NA	(mg/kg/day)	
Benzo(a)pyrene 0.270 mg/kg (2.5E-09 (mg/kg/day) 1.8E-08 1.8E-07 (mg/kg/day) 1.8E-08 1.8E-07 (mg/kg/day)	1	(mg/kg/day)	
Benzo(b)fluoranthene 0.430 mg/kg 4.0E-09 (mg/kg/day) 7.3E-01 (mg/kg/day) 2.9E-09 2.8E-07 (mg/kg/day)	4	(mg/kg/day)	
Chrysene 0.360 mg/kg 3.4E-09 (mg/kg/day) 7.3E-03 (mg/kg/day) 2.5E-11 2.4E-07 (mg/kg/day)	1	(mg/kg/day)	1
Dibenzo(a,h)anthracene		(mg/kg/day)	1 1
		(mg/kg/day)	
Arsenic 16.4 mg/kg 3.5E-08 (mg/kg/day) 1.5E+00 (mg/kg/day) 5.3E-08 (2.5E-06 (mg/kg/day) 1.5E+00 (mg/kg/day	1	(mg/kg/day)	0.008
Beryllium   3.50   mg/kg   0.0E+00   (mg/kg/day)   NA   (mg/kg/day)   -   0.0E+00   (mg/kg/day)		(mg/kg/day)	1
Cadmium   13.0   mg/kg   0.4E-10   (mg/kg/day)     6.5E-08   (mg/kg/day)     6.5E-08   mg/kg     6.5E-0		(mg/kg/day)	0.003
Chromium VI	1	(mg/kg/day)	
	1	(mg/kg/day)	
	1	(mg/kg/day)	ł <u>"</u> l
	1	(mg/kg/day)	
Manganese		(mg/kg/day)	
Exp. Route Total 8.2E-08	0.02.01	(119119 50)	0.01
Exposure Point Total 1.8E-06			0.3
Exposure Medium Total 1.8E-06			0.3
	NA NA	(ma/m³)	0.3
	NA NA	(mg/m³)	
	NA NA	(mg/m³)	
	NA NA	(mg/m <sup>3</sup> )	
	NA NA	(mg/m³)	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	NA NA	(mg/m³)	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1.5E-05	(mg/m³)	0.09
Arsenic 12E-5 mg/m³ 2.0E-08 (mg/m³) 4.3E-03 (ug/m³) 1.4E-06 (mg/m³) 4.2E-03 (ug/m³) 1.4E-06 (mg/m³) 4.2E-03 (ug/m³) 1.4E-06 (mg/m³) 4.2E-03 (ug/m³) 1.4E-06 (mg/m³) 4.2E-03 (ug/m³) 1.4E-06 (mg/m³) 4.2E-03 (ug/m³) 1.4E-06 (u	1.5E-05 2.0E-05	(mg/m³)	0.09
Beryllium 2.5E-6 mg/m³ 4.2E-0.9 (mg/m³) 2.4E-0.3 (ug/m³)¹ 1.0E-0.8 3.0E-0.7 (mg/m³) 3.0E-0.		(mg/m³)	
Cadmium 9.3E-6 mg/m³ 1.6E-08 (mg/m³) 1.6E-03 (ug/m³)¹ 2.6E-08 1.1E-06 (mg/m³)	2.0E-05	(mg/m³)	0.06
Chromium VI   6.5E-5   mg/m <sup>3</sup>   1.1E-07   (mg/m <sup>3</sup> )   8.4E-02   (ug/m <sup>3</sup> )   9.3E-06   7.7E-06   (mg/m <sup>3</sup> )   Cobalt   1.3E-5   mg/m <sup>3</sup>   2.2E-08   (mg/m <sup>3</sup> )   9.0E-03   (ug/m <sup>3</sup> )   1.9E-07   1.5E-06   (mg/m <sup>3</sup> )	1.0E-04 2.0E-05	(mg/m³)	0.08
	l .	(mg/m³)	0.08
ron 0.021 mg/m³ 3.5E-05 (mg/m³) NA (ug/m³)¹ 2.5E-03 (mg/m³)	NA NA	(mg/m³)	
Lead   3.6E-5   mg/m <sup>3</sup>   6.5E-0.8   (mg/m <sup>3</sup> )   NA   (ug/m <sup>3</sup> )     4.5E-0.6   (mg/m <sup>3</sup> )	NA 5 05 05	(mg/m³)	
Manganese 3.4E-4 mg/m³ 5.7E-07 (mg/m³) NA (ug/m³) 4.0E-05 (mg/m³)	5.0E-05	(mg/m³)	0.8
Exp. Route Total 9.6E-06			1,1
Exposure Point Total 9.6E-06			1.1
Exposure Medium Total 9.6E-06			1.1
Medium Total         1.1E-05			1.4

# TABLE 7.7. RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 3

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	T E	PC		Can	cer Risk Calculat	tions		1	Non-Ca	ncer Hazard C	alculations	
			Į.	Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/U	nit Risk	Cancer Risk	Intake/Exposur	e Concentration	Rf	D/RfC	Hazard Quotient
			ŀ			ĺ	Value	Units	Value	Units	1	Value	Units	Value	Units	1
Subsurface Soil	Subsurface Soil	Former Building 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	1.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	9.6E-09	9.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Aluminum	12,600	mg/kg	3.0E-04	(mg/kg/day)	NA	(mg/kg/day)		2.1E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
	1		i	Arsenic	23.3	mg/kg	5.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	8.4E-07	3.9E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Chromium VI	25.4	mg/kg	6.1E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)	3.0E-07	4.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.002
		Ì		Cobalt	13.3	mg/kg	3.2E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.2E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.007
				Iron	31,600	mg/kg	7.6E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		5.3E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.08
				Manganese	684	mg/kg	1.6E-05	(mg/kg/day)	NA	(mg/kg/day) '		1.1E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.05
			Exp. Route Total								1.2E-06	1				0.3
			Dermal	Benzo(a)pyrene	0.055	mg/kg	5.1E-10	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	3.8E-09	3.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
1			1	Aluminum	12,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			1	Arsenic	23.3	mg/kg	5.0E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	7.5E-08	3.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
ł		1	1	Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)		0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	
ł .		1	1	Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	
1		ĺ	1	Iron	31,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			1	Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total		•		1				7.9E-08	1			• • • • • • • • • • • • • • • • • • • •	0.01
		Exposure Point Total	<u> </u>						<del></del>		1.2E-06	1				0.3
	Exposure Medium Total	<del> </del>									1.2E-06	ir				0.3
	Air	Former Building 234	Inhalation	Benzo(a)pyrene	3.9E-8	mg/m <sup>3</sup>	6.7E-11	(mg/m³)	1.1E-03	(ug/m³) <sup>-1</sup>	7.3E-11	4.7E-09	(mg/m³)	NA	(mg/m³)	
1	<b></b>	1 officer banding 204	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Aluminum	0.009	mg/m <sup>3</sup>	1.5E-05	(mg/m³)	NA.	(ug/m³)-1		1.1E-03	(mg/m³)	5.0E-03	(mg/m³)	0.2
			1	Arsenic	1.7E-5	mg/m <sup>3</sup>	2.8E-08	(mg/m³)	4.3E-03	(ug/m³)-1	1.2E-07	2.0E-06	(mg/m³)	1.5E-05	(mg/m³)	0.1
			1	Chromium VI	1.8E-5	mg/m <sup>3</sup>	3.1E-08	(mg/m³)	8.4E-02	(ug/m³)-1	2.6E-06	2.2E-06	(mg/m³)	1.0E-04	(mg/m³)	0.02
			1	Cobalt	9.5E-6	mg/m <sup>3</sup>	1.6E-08	(mg/m³)	9.0E-03	(ug/m³)-1	1.5E-07	1.1E-06	(mg/m³)	2.0E-05	(mg/m³)	0.06
1			1	Iron	0.023	mg/m <sup>3</sup>	3.8E-05	(mg/m³)	NA	(ug/m³)-1		2.7E-03	(mg/m³)	NA.	(mg/m³)	
1			1	Manganese	4.9E-4	ma/m <sup>3</sup>	8.3E-07	(mg/m³)	NA.	(ug/m³)-1	1	5.8E-05	(mg/m³)	5.0E-05	(mg/m³)	1.2
1			Exp. Route Total	Manganese	7.02 1	mg/m	0.02.07	\iiigiii /		(09/	2.9E-06	1	(///9/11/)			1.6
		Exposure Point Total	LAP. House Folai	<u> </u>			<del> </del>				2.9E-06	-				1.6
	Exposure Medium Total	Exposure Point Total					<u> </u>				2.9E-06					1.6
	Exposure Medium Total						ļ				4.1E-06	<b></b>				1.9
Medium Total			r - :				105.00		NÁ		L	3.2E-06	(mg/kg/day)	2.0E-02	( 0 (-) \)	0.0002
Groundwater	Groundwater	Former Building 234	Ingestion	cis-1,2-Dichloroethene	12.7	ug/L	4.6E-08	(mg/kg/day)		(mg/kg/day)					(mg/kg/day)	
			1	Trichloroethene	3.90	ug/L	1.4E-08	(mg/kg/day)	4.6E-02	(mg/kg/day) <sup>-1</sup>	6.5E-10	9.9E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.002
	į			Vinyl Chloride	0.263	ug/L	9.6E-10	(mg/kg/day)	7.2E-01	(mg/kg/day) <sup>-1</sup>	6.9E-10	6.7E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0002
1				Aluminum	53.7	ug/L	2.0E-07	(mg/kg/day)	NA 155.00	(mg/kg/day)		1.4E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00001
				Arsenic	1.32	ug/L	4.8E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)	7.2E-09	3.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	l .
1				Cobalt	1.74	ug/L	6.3E-09	(mg/kg/day)	NA	(mg/kg/day)		4.4E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0001
1				Iron	459	ug/L	1.7E-06	(mg/kg/day)	NA	(mg/kg/day)		1.2E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0002
	į			Manganese	532	ug/L	1.9E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.006
		1	Exp. Route Total	<u></u>	_	,	ļ				8.5E-09	<del> </del>			T	0.009
		1	Dermal	cis-1,2-Dichloroethene	12.7	ug/L	2.8E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.0E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0010
		1	1	Trichloroethene	3.90	ug/L	9.6E-08	(mg/kg/day)	4.6E-02	(mg/kg/day)	4.4E-09	6.7E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.01
		1	1	Vinyl Chloride	0.263	ug/L	2.9E-09	(mg/kg/day)	7.2E-01	(mg/kg/day)	2.1E-09	2.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0007
1		1	1	Aluminum	53.7	ug/L	1.0E-07	(mg/kg/day)	NA .	(mg/kg/day) <sup>-1</sup>		7.2E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000007
1		1	1	Arsenic	1.32	ug/L	2.5E-09	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.8E-09	1.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0006
1			1	Cobalt	1.74	ug/L	1.3E-09	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		9.3E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00003
1		1	1	iron	459	ug/L	8.8E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		6.2E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00009
l l		1		Manganese	532	ug/L	1.0E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		7.1E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.07
ľ			Exp. Route Total								1.0E-08					0.09
ľ		Exposure Point Total			,						1.9E-08					0.10
n																

# TABLE 7.7.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 3

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	tions		l	Non-Ca	ncer Hazard Ci	alculations	
		· ·		Potential Concern	Value	Units	Intake/Exposur	e Concentration	ÇSF/L	Jnit Risk	Cancer Risk	1nteke/Exposur	e Concentration	Rf	D/RfC	Hazard Quotier
							Value	Units	Value	Units	1	Value	Units	Value	Units	1
iroundwater	Air	Former Building 234	Inhalation	cis-1,2-Dichloroethene	4.7E-4	mg/m³	8.0E-07	(mg/m <sup>3</sup> )	NΑ	(ug/m³)⁻¹		5.6E-05	(mg/m³)	NA	(mg/m³)	-
	· l			Trichloroethene	1.3E-4	mg/m <sup>3</sup>	2.1E-07	(mg/m <sup>3</sup> )	4.1E-06	(ug/m³) <sup>-1</sup>	8.7E-10	1.5E-05	(mg/m³)	5.4E-01	(mg/m³)	0.00003
				Vinyl Chloride	1.2E-5	mg/m <sup>3</sup>	2.1E-08	(mg/m <sup>3</sup> )	4.4E-06	(ug/m <sup>3</sup> )-1	9.2E-11	1.5E-06	(mg/m³)	7.7E-02	(mg/m³)	0.00002
				Aluminum	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.0E+00	(mg/m³)	5.0E-03	(mg/m³)	
			l.	Arsenic	0.0E+0	mg/m³	0.0E+00	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.0E+00	(mg/m³)	1.5E-05	(mg/m³)	
			i	Cobatt	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.0E+00	(mg/m³)	2.0E-05	(mg/m <sup>3</sup> )	
	1			Iron	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.0E+00	(mg/m³)	NA	(mg/m³)	
				Manganese	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA NA	(ug/m³)-1		0.0E+00	(mg/m³)	5.0E-05	(mg/m³)	
			Exp. Route Total					•			9.7E-10					0.00005
		Exposure Point Total	•	·						•	9.7E-10		•			0.00005
	Exposure Medium Total										9.7E-10					0.00005
Medium Total											2.0E-08					0.10
		<del>*************************************</del>					T	otal Cancer Risks	for Surface Soil	and Groundwater	1.1E-05	Total	Hazard Indices for	r Surface Soil a	and Groundwater	1.5
							Total	Cancer Risks for	Subsurface Soil	and Groundwater	4.1E-06	Total Ha	zard Indices for Su	bsurface Soil a	and Groundwater	2.0

NOT<del>O</del>S:

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.8 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 3

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

	· · · · · · · · · · · · · · · · · · ·		Т	r	1 -							ı	N 0-		-1	
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of		PC			cer Risk Calcula		Orania Bista	Lutation (Frances		ncer Hazard Ca	D/RfC	Hazard Quotient
				Potential Concern	Value	Units	Value	e Concentration Units	Value	Init Risk Units	Cancer Risk	Value	re Concentration Units	Value	Units	Hazard Cuonem
		<u> </u>	ļ			ļ <u>.</u>				<del></del>	4.05.00	!		NA.		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.8E-06	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.3E-06	3.8E-06	(mg/kg/day)		(mg/kg/day)	
				Benzo(a)pyrene	0.270	mg/kg	1.6E-06	(mg/kg/day)	7.3E+00	(mg/kg/day)	1.2E-05	3.5E-06	(mg/kg/day)	NA	(mg/kg/day)	1 1
l .				Benzo(b)fluoranthene	0.430	mg/kg	2.5E-06	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.8E-06	5.5E-06	(mg/kg/day)	NA	(mg/kg/day)	- [
B			1	Chrysene	0.360	mg/kg	2.1E-06	(mg/kg/day)	7.3E-03	(mg/kg/day)	1.5E-08	4.6E-06 7.9E-07	(mg/kg/day)	NA NA	(mg/kg/day)	1 🗓 1
ľ	ì			Dibenzo(a,h)anthracene	0.062	mg/kg	3.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	2.6E-06	II	(mg/kg/day)	NA NA	(mg/kg/day)	
1				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	1.1E-06	(mg/kg/day)	7.3E-01	(mg/kg/day)	7.7E-07 2.7E-05	2.3E-06 2.1E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.7
	'			Arsenic	16.4	mg/kg	1.8E-05	(mg/kg/day)	1.5E+00 NA	(mg/kg/day)	2./E-05	4.5E-05	(mg/kg/day) (mg/kg/day)	2.0E-04	(mg/kg/day) (mg/kg/day)	0.02
				Beryllium Cadmlum	3.50 13.0	mg/kg	3.8E-06 1.4E-05	(mg/kg/day)	NA NA	(mg/kg/day)		1.7E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.02
					91.1	mg/kg	5.3E-04	(mg/kg/day)	5.0E-01	(mg/kg/day)	2.7E-04	1.7E-04 1.2E-03	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.3
<b> </b>				Chromium VI Cobalt	91.1 17.8	mg/kg	2.0E-05	(mg/kg/day) (mg/kg/day)	NA	(mg/kg/day)	2.76-04	2.3E-04	(mg/kg/day) (mg/kg/day)	3.0E-03	(mg/kg/day)	0.4
1					30,020	mg/kg	3.3E-02	(mg/kg/day)	NA NA	(mg/kg/day)		3.8E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.5
				Iron Lead	53.6	mg/kg	5.9E-05		NA NA	(mg/kg/day)		6.9E-04	(mg/kg/day)	NA	(mg/kg/day)	
					474	mg/kg	5.9E-05 5.2E-04	(mg/kg/day)	NA NA	(mg/kg/day)		6.1E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.3
1				Manganese	4/4	mg/kg	5.2E-04	(mg/kg/day)	INA	(mg/kg/day)	3.1E-04	6.1E-03	(Hig/kg/day)	2.46-02	(Highly day)	3.0
N .		}	Exp. Route Total		1 0000		0.45.07	I	7.3E-01	T (0(d)1	3.1E-04 4.7E-07	1.4E-06	(ma/ka/da::)	NA	(ma/ka/de::\)	3.0
			Dermal	Benzo(a)anthracene	0.300	mg/kg	6.4E-07	(mg/kg/day)		(mg/kg/day) <sup>1</sup>	4.7E-07 4.2E-06	1.4E-06 1.3E-06	(mg/kg/day)	NA NA	(mg/kg/day) (mg/kg/day)	
		Ì	1	Benzo(a)pyrene	0.270	mg/kg	5.7E-07	(mg/kg/day)	7.3E+00 7.3E-01	(mg/kg/day)	4.2E-06 6.7E-07	2.0E-06	(mg/kg/day) (mg/kg/day)	NA NA	(mg/kg/day) (mg/kg/day)	
		ľ		Benzo(b)fluoranthene	0.430	mg/kg	9.1E-07 7.7E-07	(mg/kg/day)	7.3E-01 7.3E-03	(mg/kg/day)	5.6E-09	1.7E-06	(mg/kg/day) (mg/kg/day)	NA NA	(mg/kg/day)	-
l		ĺ	1	Chrysene	0.360	mg/kg	1.3E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	9.6E-07	2.9E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
			ì	Dibenzo(a,h)anthracene	0.062	mg/kg	3.8E-07	(mg/kg/day)	7.3E+00 7.3E-01	(mg/kg/day)	2.8E-07	8.4E-07	(mg/kg/day) (mg/kg/day)	NA NA	(mg/kg/day)	
10				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	1.5E-06	(mg/kg/day)		(mg/kg/day) <sup>-1</sup>	2.3E-06	1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06
				Arsenic	16.4 3.50	mg/kg mg/kg	0.0E+00	(mg/kg/day)	1.5E+00 NA	(mg/kg/day)	2.3E-00	0.0E+00	(mg/kg/day) (mg/kg/day)	1.4E-05	(mg/kg/day)	0.00
1				Beryllium	1		4.0E-08	(mg/kg/day)	NA NA	(mg/kg/day)		4.7E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.02
ſ				Cadmium Chromium VI	13.0 91.1	mg/kg mg/kg	0.0E+00	(mg/kg/day) (mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup> (mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.02
H				Cobalt	17.8	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	1 (
X					30,020	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
N .				fron Lead	53.6	mg/kg mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) 1 (mg/kg/day)		0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)	
H				Manganese	474	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total	Manganese	4/4	mg/kg	0.02400	(Hig/kg/day)	L	(Hig/kg/day)	8.8E-06	0.02400	(Highlightay)	0.02.04	(mg/ng/ca)/	80.0
1	1	5 0.47.4	Exp. Roule Total	<u> </u>							3.2E-04					3.1
1		Exposure Point Total									3.2E-04					3.1
	Exposure Medium Total	·		In 177 %					445.04	I 3.1		2.6E-11	1	NA	·3\	3.1
1	Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	1.2E-11	(mg/m³)	1.1E-04	(ug/m³)-1	1.3E-12	2.6E-11 2.4E-11	(mg/m³)	NA NA	(mg/m³)	
j				Benzo(a)pyrene	2.5E-11	mg/m³	1.1E-11	(mg/m³)	1.1E-03	(ug/m³)-1	1.2E-11		(mg/m³)	NA NA	(mg/m³)	
ij		İ		Benzo(b)fluoranthene	3.9E-11	mg/m³	1.7E-11	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	1.9E-12 1.6E-13	3.7E-11 3.1E-11	(mg/m³)	NA NA	(mg/m³)	
	1	}		Chrysene	3.3E-11	mg/m <sup>3</sup>	1.4E-11	(mg/m³)	1.1E-05	(ug/m³) <sup>-1</sup>	3.0E-12	5.4E-11	(mg/m³)	NA NA	(mg/m³)	
l		]	1	Dibenzo(a,h)anthracene	5.6E-12 1.6E-11	mg/m <sup>3</sup>	2.5E-12 7.2E-12	(mg/m <sup>3</sup> )	1.2E-03 1.1E-04	(ug/m³) <sup>-1</sup>	7.9E-13	5.4E-12 1.6E-11	(mg/m³) (mg/m³)	NA NA	(mg/m³) (mg/m³)	
Į.		]		Indeno(1,2,3-cd)pyrene	L	mg/m³	II .	(mg/m³)	4.3E-03	(ug/m³) <sup>-1</sup>	5.3E-10	1.4E-09	1	1,5E-05		0.00010
			į.	Arsenic Bervilium	1.5E-9 3.2E-10	mg/m³	1.2E-10 2.6E-11	(mg/m³)	4.3E-03 2.4E-03	(ug/m³)-1 (ug/m³)-1	6.3E-10	3.1E-10	(mg/m³) (mg/m³)	2.0E-05	(mg/m³) (mg/m³)	0.00002
				l '		mg/m³	9.7E-11	(mg/m³)	1.8E-03		1.7E-10	1.1E-09	1 ' " .'	2.0E-05		0.00002
i			1	Cadmium VI	1.2E-9	mg/m³	II .	(mg/m³)	8.4E-02	(ug/m³) <sup>-1</sup>	3.0E-07	7.9E-09	(mg/m³) (mg/m³)	1.0E-04	(mg/m³) (mg/m³)	0.00008
		ļ.	1	Chromium VI	8.3E-9 1.6E-9	mg/m³	3.6E-09	(mg/m³)	9.0E-03	(ug/m³) <sup>-1</sup>	1.2E-09	1.6E-09	(mg/m³) (mg/m³)	6.0E-04	(mg/m³)	0.0003
		1	1	Cobalt	2.7E-6	mg/m <sup>3</sup>	1.3E-10 2.2E-07	(mg/m³)	NA NA	(ug/m³) <sup>-1</sup> (ug/m³) <sup>-1</sup>	1.26-09	2.6E-06	(mg/m <sup>3</sup> )	NA	(mg/m <sup>3</sup> )	0.0003
1		İ	1	Iron Lead	4.9E-9	mg/m³	4.0E-10	(mg/m³) (mg/m³)	NA NA	(ug/m²) 1		4.7E-09	(mg/m³)	NA NA	(mg/m <sup>3</sup> )	
N .		1	1	1	4.9E-9 4.3E-8	mg/m³	3.5E-09	1 1 1	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		4.1E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0008
N .		1	For Body 7 11	Manganese	4,3E-8	mg/m <sup>3</sup>	3.5E-09	(mg/m³)	I INM	T (non)	3.1E-07	4.12.00	(mg/m)	J.VL-03	1 (1119/111.)	0.0008
l .			Exp. Route Total	L			<del></del>				3.1E-07 3.1E-07	ļ	******			0.001
1		Exposure Point Total					<del> </del>				3.1E-07 3.1E-07	<del> </del>				0.001
	Exposure Medium Total						<b></b>									3.1
Medium Total							L				3.2E-04	1				3.1

# TABLE 7.8.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVISTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 3

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Lite dissess	Exposure Medium	Exposure Point	Exposure Route	Chemical of	-	PC	ı—————		ncer Risk Calcula	liana.	· ·	1	Nes Ce	ncer Hazard C	ale, deliene	
Medium	Exposure Medium	Exposure Form	Exposure nouse	Potential Concern	Value	Units	Intako/Exposur	e Concentration		Init Risk	Cancer Risk	Intake/Exposur	re Concentration		D/RfC	Hazard Quotient
Į.				r dierman Goriconn	Value	Oillis	Value	Units	Value	Units	Cancer Hisk	Value	Units	Value	I Units	riazara Quononi
0.1	0.4	F D. //-// 004	1	D/->	0.055		<u> </u>			<del></del>	0.05.00					
Subsurtace Soil	Subsurface Soil	Former Building 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	3.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day)	2.3E-06	7.0E-07	(mg/kg/day)	NA 4.05.00	(mg/kg/day)	
1				Aluminum	12,600	mg/kg	1.4E-02	(mg/kg/day)	NA	(mg/kg/day)		1.6E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.2
ı			1	Arsenic	23.3	mg/kg	2.6E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)	3.8E-05	3.0E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.0
l .				Chromium VI	25.4	mg/kg	1.5E-04	(mg/kg/day)	5.0E-01	(mg/kg/day)	7.4E-05	3.2E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.1
1				Cobalt	13.3	mg/kg	1.5E-05	(mg/kg/day)	NA	(mg/kg/day)		1.7E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.6
1				Iron	31,600	mg/kg	3.5E-02	(mg/kg/day)	NA NA	(mg/kg/day)		4.0E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.6
l				Manganese	684	mg/kg	7.5E-04	(mg/kg/day)	NA	(mg/kg/day)		8.7E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.4
ľ			Exp. Route Total	ļ	,	,					1.1E-04					2.8
			Dermal	Benzo(a)pyrene	0.055	mg/kg	1.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	8.5E-07	2.6E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Aluminum	12,600	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	- 1
l				Arsenic	23.3	mg/kg	2.1E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.2E-06	2.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
1			Į.	Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
			Į.	Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	-
l .			ľ	Iron	31,600	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	- 1
li .			<u> </u>	Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
1			Exp. Route Total								4.1E-06			. <u>.</u>		0.08
l		Exposure Point Total									1.2E-04	L				2.9
Ì	Exposure Medium Total										1.2E-04					2.9
li .	Air	Former Building 234	Inhafation	Benzo(a)pyrene	5.0E-12	mg/m³	2.2E-12	(mg/m³)	1.1E-03	(ug/m³) <sup>-1</sup>	2.4E-12	4.8E-12	(mg/m³)	NA	(mg/m³)	
II.				Aluminum	1.1E-6	mg/m³	9.4E-08	(mg/m³)	NA NA	(ug/m³) <sup>-1</sup>		1.1E-06	(mg/m³)	5.0E-03	(mg/m³)	0.0002
1				Arsenic	2.1E-9	mg/m <sup>3</sup>	1.7E-10	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	7.5E-10	2.0E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001
1			1	Chromium VI	2.3E-9	mg/m³	1.0E-09	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	8.5E-08	2.2E-09	(mg/m <sup>3</sup> )	1.0E-04	(mg/m³)	0.00002
				Cobalt	1.2E-9	mg/m³	9.9E-11	(mg/m <sup>3</sup> )	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	8.9E-10	1.2E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0002
1			İ	Iron	2.9E-6	mg/m <sup>3</sup>	2.4E-07	(mg/m <sup>3</sup> )	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.8E-06	(mg/m <sup>3</sup> )	NA	(mg/m <sup>3</sup> )	
i			İ	Manganese	6.2E-8	mg/m <sup>3</sup>	5.1E-09	(mg/m <sup>3</sup> )	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		6.0E-08	(mg/m <sup>3</sup> )	5.0E-05	(mg/m <sup>3</sup> )	0.001
			Exp. Route Total								8.7E-08					0.002
l .	i	Exposure Point Total				_					8.7E-08	i		<u>-</u>		0.002
	Exposure Medium Total										8.7E-08					0.002
Medium Total		····					<u> </u>				1.2E-04	<del>                                     </del>				2.9
Groundwater	Groundwater	Former Building 234	Ingestion	cis-1.2-Dichloroethene	12.7	ug/L	7.0E-05	(mg/kg/day)	NA	(mg/kg/day)		8.1E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.4
GIOGIAWATEI	GIOGINAWAIGI	1 Officer Ballating 204	II regulation	Trichloroethene (Mutagenic)	3.90	ug/L	1.1E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)-1	1.1E-06	2.5E-04	(mg/kg/day)	NA.	(mg/kg/day)	
i				Trichloroethene (Nonmutagenic)	3.90	ug/L	2.1E-05	(mg/kg/day)	3.7E-02	(mg/kg/day) <sup>-1</sup>	7.8E-07	2.5E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.5
l .			l,	Vinyi Chtoride	0.263	ug/L ug/L	1.9E-05	(mg/kg/day)	7.2E-01	(mg/kg/day)	1.4E-05	1.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006
ll .				Aluminum	53.7	ug/L	2.9E-04	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>	1.42-03	3.4E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
JI				Arsenic	1.32	ug/L	7.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)	1.1E-05	8.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.3
			1	Cobalt	1.74	ug/L	9.5E-06	(mg/kg/day)	NA NA	(mg/kg/day)	1.10-03	1.1E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.4
				Iron	459	ug/L	2.5E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		2.9E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
				Manganese	532	ug/L	2.9E-03	(mg/kg/day)	NA NA	1		3.4E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	1.4
1			Exp. Route Total	Mariganese	532	I ug/L	2.9E-03	(Hig/kg/day)	I NA	(mg/kg/day) <sup>-1</sup>	2.6E-05	3,46-02	(nig/kg/day)	2.46-02	(Hig/kg/day)	3.0
				1	1		0.05.00			1		1.55.0.		0.05.00	1 /	
			Dermal	cis-1,2-Dichloroethene	12.7	ug/L	8.6E-06	(mg/kg/day)	NA	(mg/kg/day)		1.0E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.05
				Trichloroethene (Mutagenic)	3.90	ug/L	1.8E-05	(mg/kg/day)	9.3E-03	(mg/kg/day)	1.7E-07	4.0E-05	(mg/kg/day)	NA	(mg/kg/day)	
				Trichloroethene (Nonmutagenic	3.90	ug/L	3.5E-06	(mg/kg/day)	3.7E-02	(mg/kg/day)	1.3E-07	4.0E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.08
			l	Vinyl Chloride	0.263	ug/L	1.0E-06	(mg/kg/day)	7.2E-01	(mg/kg/day)	7.4E-07	9.1E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0003
1				Aluminum	53.7	ug/L	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)		2.3E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00002
				Arsenic	1.32	ug/L	4.8E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)	7.2E-08	5.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
1				Cobalt	1.74	ug/L	2.5E-08	(mg/kg/day)	NA 	(mg/kg/day)		2.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0010
	1		1	Iron	459	ug/L	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)		1.9E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0003
	1			Manganese	532	ug/L	1.9E-05	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		2.2E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.2
	}		Exp. Route Total								1.1E-06					0.4
		Exposure Point Total					<u> </u>				2.7E-05	ļ				3.4
ii .	Exposure Medium Total		-				1				2.7E-05					3.4

# TABLE 7.8.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVISTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 3

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	cer Risk Calculat	ions			Non-Ca	ncer Hazard Ca	alculations	
				Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/U	nit Risk	Cancer Risk	Intake/Exposur	e Concentration	Rff	D/RfC	Hazard Quotien
							Value	Units	Value	Units		Value	Units	Value	Units	
roundwater	Air	Former Building 234	Inhalation	cis-1,2-Dichloroethene	0.006	mg/m³	5.2E-04	(mg/m <sup>3</sup> )	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		6.1E-03	(mg/m³)	NA	(mg/m³)	
				Trichloroethene (Mutagenic)	0.002	mg/m <sup>3</sup>	8.5E-04	(mg/m³)	1.0E-06	(ug/m³)-1	8.5E-07	1.9E-03	(mg/m³)	NA	(mg/m³)	
				Trichloroethene (Nonmutagenic	0.002	mg/m <sup>3</sup>	1.6E-04	(mg/m³)	3.1E-06	(ug/m³) <sup>-1</sup>	5.0E-07	1.9E-03	(mg/m³)	2.0E-03	(mg/m³)	0.9
			i	Vinyl Chloride	1.3E-4	mg/m³	1.4E-04	(mg/m³)	4.4E-06	(ug/m <sup>3</sup> ).1	6.3E-07	1.3E-04	(mg/m³)	1.0E-01	(mg/m³)	0.001
				Aluminum	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		0.0E+00	(mg/m³)	5.0E-03	(mg/m³)	1
				Arsenic	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	4.3E-03	(ug/m³) <sup>-1</sup>		0.0E+00	(mg/m³)	1.5E-05	(mg/m³)	1
			ļ	Cobalt	0.0E+0	mg/m³	0.0E+00	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.0E+00	(mg/m³)	6.0E-06	(mg/m³)	
	ļ		1	tron	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.0E+00	(mg/m³)	NA	(mg/m³)	
		ļ		Manganese	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.0E+00	(mg/m³)	5.0E-05	(mg/m³)	
	1		Exp. Route Total								2.0E-06					0.9
		Exposure Point Total									2.0E-06					0.9
	Exposure Medium Total										2.0E-06					0.9
Medium Total							Ì			<del></del>	2.9E-05					4.3
							T.	otal Cancer Risks	for Surface Soil a	nd Groundwater	3.5E-04	Total	Hazard Indices for	r Surtace Soll a	nd Groundwater	7
	** *			·			Total	Cancer Risks for S	Subsurface Soll a	nd Groundwater	1.5E-04	Total Ha	zard Indices for Su	bsurface Soil a	nd Groundwater	T B

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 7.9 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	tions			Non-Ca	ncer Hazard C	alculations	
	1 "	,		Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Hf	D/RfC	Hazard Quotient
						1	Value	Units	Value	Units	l	Value	Units	Value	Units	]
urface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.300	mg/kg	2.6E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) 1	1.9E-07	4.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
	1	ľ		Benzo(a)pyrene	0.270	mg/kg	2.3E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.7E-06	3.7E-07	(mg/kg/day)	NA.	(mg/kg/day)	
		]		Benzo(b)fluoranthene	0.430	mg/kg	3.7E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.7E-07	5.9E-07	(mg/kg/day)	NA.	(mg/kg/day)	
				Chrysene	0.360	mg/kg	3.1E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	2.3E-09	4.9E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.062	mg/kg	5.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	3.9E-07	8.5E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	1.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.1E-07	2.5E-07	(mg/kg/day)	NA.	(mg/kg/day)	
		l .	i	Arsenic	16.4	mg/kg	7.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.2E-05	2.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07
	l l			Beryllium	3.50	mg/kg	1.6E-06	(mg/kg/day)	NA	(mg/kg/day)		4.8E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.002
				Cadmium	13.0	mg/kg	6.1E-06	(mg/kg/day)	NA	(mg/kg/day)		1.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.04
		1		Chromium VI	91.1	mg/kg	7.8E-05	(mg/kg/day)	5.0E-01	(mg/kg/day).1	3.9E-05	1.2E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.04
				Cobalt	17.8	mg/kg	8.4E-06	(mg/kg/day)	NA.	(mg/kg/day).		2.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
				Iron	30,020	mg/kg	1.4E-02	(mg/kg/day)	NA.	(mg/kg/day)-1		4.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06
				Lead	53.6	mg/kg	2.5E-05	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		7.3E-05	(mg/kg/day)	NA.	(mg/kg/day)	
				Manganese	474	mg/kg	2.2E-04	(mg/kg/day)	NA.	(mg/kg/day)		6.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03
			Eve Doute T-1-1	Manganese	1 7/7	mgrkg	2.22-04	(nigragiaay)	110	(ilig/kg/day)	5.3E-05	1	(mgmg-say)		1 (mg-mg-day)	0.3
			Exp. Route Total		1 0 000	T	4.05.07	(madicalda)	T 7.0E.01		9.8E-08	2.1E-07	(ma/ka/da:*)	NA	(ma/ka/da:a	0.5
			Dermal	Benzo(a)anthracene	0.300	mg/kg	1.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)		K	(mg/kg/day)	NA NA	(mg/kg/day)	
				Benzo(a)pyrene	0.270	mg/kg	1.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day)	8.8E-07	1.9E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
			1	Benzo(b)fluoranthene	0.430	mg/kg	1.9E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.4E-07 1.2E-09	3.1E-07 2.6E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
				Chrysene	0.360	mg/kg	1.6E-07	(mg/kg/day)	7.3E-03	(mg/kg/day)		11	(mg/kg/day)		(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.062	mg/kg	2.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)	2.0E-07	4.4E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	8.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	5.9E-08	1.3E-07	(mg/kg/day)	NA OOF O	(mg/kg/day)	1
			1	Arsenic	16.4	mg/kg	9.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	1.4E-06	2.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009
				Beryllium	3.50	mg/kg	0.0E+00	(mg/kg/day)	NA 	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	
				Cadmium	13.0	mg/kg	2.4E-08	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		7.1E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.003
				Chromium VI	91.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	17.B	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	30,020	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Lead	53.6	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day)	-
				Manganese	474	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total								2.8E-06	<u>                                     </u>				0.01
		Exposure Point Total					1				5.6E-05					0.3
	Exposure Medium Total										5.6E-05	1				0.3
	Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	1.6E-11	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	1.8E-12	2.6E-11	(mg/m³)	NA NA	(mg/m³)	
	[ ···	', ',		Benzo(a)pyrene	2.5E-11	mg/m³	1.5E-11	(mg/m³)	1.1E-03	(ug/m³)-1	1.6E-11	2.4E-11	(mg/m³)	NA NA	(mg/m <sup>3</sup> )	
			1	Benzo(b)fluoranthene	3.9E-11	mg/m <sup>3</sup>	2.4E-11	(mg/m³)	1.1E-04	(ug/m³)-1	2.6E-12	3.7E-11	(mg/m³)	NA NA	(mg/m³)	
			Į.	Chrysene	3.3E-11	mg/m <sup>3</sup>	2.0E-11	(mg/m³)	1.1E-05	(ug/m³)-1	2.2E-13	3.1E-11	(mg/m³)	NA NA	(mg/m³)	
			1	Dibenzo(a,h)anthracene	5.6E-12	mg/m <sup>3</sup>	3.4E-12	(mg/m³)	1.2E-03	(ug/m³).1	4.1E-12	5.4E-12	(mg/m³)	NA.	(mg/m³)	
	1			Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m³	9.9E-12	(mg/m <sup>3</sup> )	1.1E-04	(ug/m³) 1	1.1E-12	1.6E-11	(mg/m³)	NA.	(mg/m³)	
	{			Arsenic	1.5E-9	mg/m <sup>3</sup>	4.9E-10	(mg/m³)	4.3E-03	(ug/m³).1	2.1E-09	1.4E-09	(mg/m³)	1.5E-05	(mg/m <sup>3</sup> )	0.00010
	ľ			Beryllium	3.2E-10	mg/m <sup>3</sup>	1.0E-10	(mg/m³)	2.4E-03	(ug/m³)·1	2.5E-10	3.1E-10	(mg/m³)	2.0E-05	(mg/m³)	0.00002
				Cadmium	1.2E-9	mg/m <sup>3</sup>	3.9E-10	(mg/m³)	1.8E-03	(ug/m³)-1	7.0E-10	1.1E-09	(mg/m³)	2.0E-05	(mg/m³)	0.00006
				Chromium VI	8.3E-9	mg/m <sup>3</sup>	5.0E-09	(mg/m³)	8.4E-02	(ug/m³)-1	4.2E-07	7.9E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00008
				Cobalt	1.6E-9	mg/m <sup>3</sup>	5.3E-10	(mg/m³)	9.0E-03	(ug/m³) <sup>-1</sup>	4.8E-09	1.6E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003
			1	Iron	2.7E-6	mg/m³	9.0E-07	(mg/m <sup>3</sup> )	NA	(ug/m³)-1	4.52-03	2.6E-06	(mg/m³)	NA	(mg/m³)	
			1	Lead	4.9E-9		1.6E-09		NA NA	(ug/m³)-1		4.7E-09	(mg/m³)	NA.	(mg/m³)	
		ļ	1		4.9E-9 4.3E-8	mg/m <sup>3</sup> mg/m <sup>3</sup>	1.6E-09 1.4E-08	(mg/m³) (mg/m³)	NA NA	(ug/m <sup>-</sup> ) <sup>-1</sup>		4.7E-08	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	0.0008
			En But Til	Manganese	4.3E-8	1 mg/m°	1.46-08	(mg/m-)	197	(ug/m)	4.3E-07	4.12-08	(mg/m)	3.0E-05	[ (mg/m )	0.0008
			Exp. Route Total	L			ļ									0.001
		Exposure Point Total					<u> </u>				4.3E-07	ļ				
	Exposure Medium Total						ļ				4.3E-07					0.001
											5.7E-05					0.3

# TABLE 7.9.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 3

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	ľ	Cai	ncer Risk Calcula	itions			Non-Ca	incer Hazard C	alculations	
	· ·		· ·	Potential Concern	Value	Units	Intake/Exposur	re Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
	_						Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Former Building 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	4.7E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.5E-07	7.5E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Aluminum	12,600	mg/kg	5.9E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.7E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
				Arsenic	23.3	mg/kg	1.1E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.6E-05	3.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
		}		Chromium VI	25.4	mg/kg	2.2E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	1.1E-05	3.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01
	[			Cobalt	13.3	mg/kg	6.2E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06
				Iron	31,600	mg/kg	1.5E-02	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>	1	4.3E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06
1		i		Manganese	684	mg/kg	3.2E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		9.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04
			Exp. Route Total								2.8E-05	]				0.3
			Dermal	Benzo(a)pyrene	0.055	mg/kg	2.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	1.8E-07	3.9E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Aluminum	12,600	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	23.3	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	2.0E-06	3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	31,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
		}	<u></u>	Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	<del></del>
			Exp. Route Total								2.1E-06	<b> </b>				0.01
		Exposure Point Total									3.0E-05	<u> </u>				0.3
	Exposure Medium Total										3.0E-05					0.3
	Air	Former Building 234	Inhalation	Benzo(a)pyrene	5.0E-12	mg/m <sup>3</sup>	3.0E-12	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.3E-12	4.8E-12	(mg/m³)	NA	(mg/m³)	
		İ		Aluminum	1.1E-6	mg/m³	3.8E-07	(mg/m³)	NA NA	(ug/m <sup>3</sup> )-1		1.1E-06	(mg/m³)	5.0E-03	(mg/m³)	0.0002
				Arsenic	2.1E-9	mg/m <sup>3</sup>	7.0E-10	(mg/m³)	4.3E-03	(ug/m³) <sup>-1</sup>	3.0E-09	2.0E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001
				Chromium VI	2.3E-9	mg/m <sup>3</sup>	1.4E-09	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.2E-07	2.2E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002
				Cobatt	1.2E-9	mg/m <sup>3</sup>	4.0E-10	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> )-1	3.6E-09	1.2E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0002
				Iron	2.9E-6	mg/m³	9.4E-07	(mg/m³)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.8E-06	(mg/m³)	NA	(mg/m³)	
				Manganese	6.2E-8	mg/m <sup>3</sup>	2.0E-08	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		6.0E-08	(mg/m³)	5.0E-05	(mg/m³)	0.001
			Exp. Route Total				l				1.2E-07					0.002
		Exposure Point Total									1.2E-07					0.002
	Exposure Medium Total										1.2E-07	<u> </u>				0.002
Medium Total											3.0E-05	1				0.3
Groundwater	Groundwater	Former Building 234	Ingestion	cis-1,2-Dichloroethene	12.7	ug/L	1.2E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.5E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.2
			1	Trichloroethene (Mutagenic)	3.90	ug/L	6.7E-05	(mg/kg/day)	9.3E-03	(mg/kg/day) <sup>-1</sup>	6.2E-07	1.1E-04	(mg/kg/day)	NA NA	(mg/kg/day)	
	1			Trichloroethene (Nonmutagenic	3.90	ug/L	3.7E-05	(mg/kg/day)	3.7E-02	(mg/kg/day) <sup>-1</sup>	1.3E-06	1.1E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.2
				Vinyl Chloride	0.263	ug/L	2.5E-06	(mg/kg/day)	7.2E-01	(mg/kg/day)	1.8E-06	7.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
				Aluminum	53.7	ug/L	5.0E-04	(mg/kg/day)	NA	(mg/kg/day)		1.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.001
				Arsenic	1.32	ug/L	1.2E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)	1.9E-05	3.6E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
		ľ		Cobalt	1.74	ug/L	1.6E-05	(mg/kg/day)	NA NA	(mg/kg/day)		4.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.2
				Iron	459	ug/L	4.3E-03	(mg/kg/day)	NA	(mg/kg/day)		1.3E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.02
				Manganese	532	ug/L	5.0E-03	(mg/kg/day)	NA NA	(mg/kg/day)		1.5E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.6
	1	l .	Exp. Route Total				ļ	,	T		2.2E-05	<u>.                                    </u>	-		•	1.3
			Dermal	cis-1,2-Dichloroethene	12.7	ug/L	1.5E-05	(mg/kg/day)	NA	(mg/kg/day)-1		4.3E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.02
		1	1	Trichloroethene (Mutagenic)	3.90	ug/L	1.1E-05	(mg/kg/day)	9.3E-03	(mg/kg/day) <sup>-1</sup>	1.0E-07	1.8E-05	(mg/kg/day)	NA	(mg/kg/day)	
		1	I	Trichloroethene (Nonmutagenic	3.90	ug/L	6.2E-06	(mg/kg/day)	3.7E-02	(mg/kg/day) <sup>-1</sup>	2.3E-07	1.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.04
			1	Vlnyl Chloride	0.263	ug/L	1.3E-07	(mg/kg/day)	7.2E-01	(mg/kg/day)	9.5E-08	3.8E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0001
				Aluminum	53.7	ug/L	2.6E-06	(mg/kg/day)	NA.	(mg/kg/day)		7.7E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000008
			1	Arsenic	1.32	ug/L	6.5E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)	9.7E-08	1.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0006
		(	I	Cobalt	1.74	ug/L	3.4E-08	(mg/kg/day)	NA 	(mg/kg/day)		1.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0003
		1	1	Iron	459	ug/L	2.3E-05	(mg/kg/day)	NA 	(mg/kg/day)		6.6E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00009
		1		Manganese	532	ug/L	2.6E-05	(mg/kg/day)	NA .	(mg/kg/day)		7.6E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.08
	1		Exp. Route Total								5.2E-07					0.1
		Exposure Point Total					<u> </u>				2.3E-05	<u> </u>				1.4
	Exposure Medium Total						JL				2.3E-05	<u> </u>				] 1.4

# TABLE 7.9.RME CALCULATION OF CHEMICAL CANCER HISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 OF 3

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	cer Risk Calculat	ions			Non-Ca	ncer Hazard Ca	alculations	
		·	1	Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/U	nit Risk	Cancer Risk	Intake/Exposu	e Concentration	Rft	D/RfC	Hazard Quotien
		ľ	1				Value	Units	Value	Units		Value	Units	Value	Units	1
Groundwater	Air	Former Building 234	Inhalation	cis-1,2-Dichloroethene	0.006	mg/m³	2.1E-03	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		6.1E-03	(mg/m³)	NA.	(mg/m³)	
				Trichloroethene (Mutagenic)	0.002	mg/m³	1.2E-03	(mg/m³)	1.0E-06	(ug/m³)-1	1.2E-06	1.9E-03	(mg/m³)	NA	(mg/m³)	-
		1		Trichtoroethene (Nonmutagenic	0.002	mg/m <sup>3</sup>	6.4E-04	(mg/m³)	3.1E-06	(ug/m³) <sup>-1</sup>	2.0E-06	1.9E-03	(mg/m³)	2.0E-03	(mg/m³)	0.9
				Vinyl Chloride	1.3E-4	mg/m³	4.3E-05	(mg/m³)	4.4E-06	(ug/m³) <sup>-1</sup>	1.9E-07	1.3E-04	(mg/m³)	1.0E-01	(mg/m³)	0.001
				Atuminum	0.0E+0	mg/m <sup>3</sup>	0.0E+00	(mg/m³)	NA.	(ug/m³) <sup>-1</sup>		0.0E+00	(mg/m³)	5.0E-03	(mg/m³)	
	1			Arsenic	0.0E+0	mg/m³	0.0E+00	(mg/m³)	4.3E-03	(ug/m³)-1		0.0E+00	(mg/m³)	1.5E-05	(mg/m³)	
	1	İ		Cobalt	0.0E+0	mg/m³	0.0E+00	(mg/m³)	9.0E-03	(ug/m³)-1		0.0E+00	(mg/m³)	6.0E-06	(mg/m³)	
				Iron	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.0E+00	(mg/m³)	NA	(mg/m³)	-
				Manganese	0.0E+0	mg/m³	0.0E+00	(mg/m <sup>3</sup> )	NA	(ug/m <sup>3</sup> )-1	-:. <u>-</u>	0.0E+00	(mg/m³)	5.0E-05	(mg/m³)	
			Exp. Route Total								3.4E-06					0.9
		Exposure Point Total									3.4E-06					0.9
	Exposure Medium Total										3.4E-06					0.9
Medium Total	<u> </u>	<del>-</del>							,		2.6E-05					2.4
							1	otal Cancer Risks	for Surface Soil a	nd Groundwater	8.3E-05	Tota	Hazard Indices for	Surface Soil a	nd Groundwater	2.7
							Total	Cancer Risks for !	Subsurtace Soil a	nd Groundwater	5.6E-05	Total Ha	zard Indices for Su	bsurface Soil a	nd Groundwater	2.7

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



# LIST OF TABLES RAGS PART D TABLE 7 - SOUTH WATERFRONT CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.	
	Reasonable Maximum Exposures
7.1.RME	Future Adolescent Trespassers - South Waterfront
7.2.RME	Future Adult Trespassers - South Waterfront
7.3.RME	Future Industrial Workers - South Waterfront
7.4.RME	Current/Future Construction Workers - North Waterfront
7.5.RME	Hypothetical Child Residents - South Waterfront
7.6.RME	Hypothetical Adult Residents - South Waterfront

## TABLE 7.3.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timetrame: Current/Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	ations			Non-Ca	ncer Hazard Ci	alculations	
	· ·	· .	1	Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/I	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfl	D/RfC	Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	5.5E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.5E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
			"	Arsenic	23.7	mg/kg	8.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.2E-05	2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
				Chromium VI	19.1	mg/kg	6.7E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	3.3E-06	1.9E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006
			ļ	Cobalt	23.6	mg/kg	8.3E-06	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
				iron	41,800	mg/kg	1.5E-02	(mg/kg/day)	NA	(mg/kg/day)		4.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06
			Exp. Route Total	1							1.6E-05					0.2
	1		Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	23.7	ma/ka	1.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.5E-06	4.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
			1	Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
			1	Cobalt	23.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	41,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	7:0E-01	(mg/kg/day)	
			Exp. Route Total	1						_1; v	2.5E-06					0.02
		Exposure Point Total									1.8E-05		_			0.3
	Exposure Medium Total							21.27			1.8E-05		• • •			0.3
	Air	South Waterfront	Inhalation	Aluminum	1.4E-6	mg/m³	1.2E-07	(mg/m³)	NA.	(ug/m <sup>3</sup> )-1		3.3E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00007
	(°''	Codin Wateringti	II // I I I I I I I I I I I I I I I I I	Arsenic	2.2E-9	mg/m³	1.8E-10	(mg/m³)	4.3E-03	(ug/m³)-1	7.6E-10	4.9E-10	(mg/m³)	1.5E-05	(mg/m³)	0.00003
				Chromium VI	1.7E-9	mg/m³	1.4E-10	(mg/m³)	8.4E-02	(ug/m³)-1	1.2E-08	4.0E-10	(ma/m³)	1.0E-04	(mg/m <sup>3</sup> )	0.000004
				Cobalt	2.2E-9	mg/m³	1.8E-10	(mg/m³)	9.0E-03	(ug/m³)·1	1.6E-09	4.9E-10	(mg/m <sup>3</sup> )	6.0E-06	(mg/m <sup>3</sup> )	0.00008
				Iron	3.8E-6	mg/m³	3.1E-07	(mg/m³)	NA.	(ug/m³)-1	-1-	8.7E-07	(mg/m³)	NA	(mg/m³)	
l			Exp. Route Total	1		<u> </u>			•		1.4E-08			- (-		0.0002
l		Exposure Point Total		L							1.4E-08					0.0002
	Exposure Medium Total	Exposure Folia					i				1.4E-08					0.0002
Medium Total	Exposure Medium Total				<u></u>						1.8E-05					0.3
wedium rotal											00					

Total of Receptor Risks Across All Media

1.8E-05

Total of Receptor Hazards Across All Media

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.1.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Cai	ncer Risk Calcula	ations			Non-Ca	ncer Hazard C	alculations	
			1	Potential Concern	Value	Units	Intake/Exposul	e Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotier
	1		1		1		Value	Units	Value	Units		Value	Units	Value	Units	1
urface Soil	Surface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	5.9E-04	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		4.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.004
				Arsenic	23.7	mg/kg	8.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.3E-06	6.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Chromium VI	19.1	mg/kg	2.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	1.1E-06	5.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
			İ	Cobalt	23.8	mg/kg	8.9E-07	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		6.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
	*			Iron	41,800	mg/kg	1.6E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.02
			Exp. Route Total								2.4E-06					0.06
			Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	23.7	mg/kg	5.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	8.8E-07	4.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
	}			Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
	}			Cobalt	23.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
	1			)ron	41,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
	i		Exp. Route Total								8.8E-07					0.01_
	L	Exposure Point Total									3.3E-06					0.08
	Exposure Medium Total	,									3.3E-06				, ,	0.08
	Air	South Waterfront	Inhalation	Aluminum	1.4E-6	mg/m³	4.5E-09	(mg/m³)	NA NA	(ug/m³)-1		3.1E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000006
				Arsenic	2.2E-9	mg/m³	6.7E-12	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> )-1	2.9E-11	4.7E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003
				Chromium VI	1.7E-9	mg/m <sup>3</sup>	1.6E-11	(mg/m³)	8.4E-02	(ug/m³)-1	1.4E-09	3.8E-11	(mg/m <sup>3</sup> )	1.0E-04	(mg/m³)	3.8E-7
				Cobalt	2.2E-9	mg/m <sup>3</sup>	6.8E-12	(mg/m³)	9.0E-03	(ug/m³)-1	6.1E-11	4.7E-11	(mg/m³)	6.0E-06	(mg/m³)	800000.0
			<u> </u>	Iron	3.8E-6	mg/m³	1.2E-08	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		B.3E-08	(mg/m³)	NA	(mg/m³)	
			Exp. Route Total								1.5E-09	}				0.00002
		Exposure Point Total									1.5E-09					0.00002
	Exposure Medium Total			***************************************							1.5E-09					0.00002
Medium Total	*										3.3E-06			* *		0.08
								Total o	f Receptor Risks	Across All Media	3.3E-06		Total of Rec	otor Hazards	Across All Media	0.08

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.2.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	tions			Non-Ca	ncer Hazard C	elculations	
		· '	'	Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/I	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotier
	ì	ļ				ŀ	Value	Units	Value	Units	i	Value	Units	Value	Units	1
ubsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	8.5E-04	(mg/kg/day)	NA	(mg/kg/day)-1		3.0E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
			1	Arsenic	23.7	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	1.9E-06	4.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
			i	Chromium VI	19.1	mg/kg	1.0E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	5.1E-07	3.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001
				Cobalt	23.8	mg/kg	1.3E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
	ľ			Iron	41,800	mg/kg	2.2E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		7.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
			Exp. Route Total								2.4E-06					0.05
			Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	23.7	mg/kg	1.5E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.3E-07	5.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
		}	1	Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
	1	1		Cobalt	23.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
	1			Iron	41,800	mg/kg	0.0E+00	(mg/kg/day)-	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
	1		Exp. Route Total								2.3E-07					0.002
		Exposure Point Total									2.6E-06					0.05
	Exposure Medium Total										2.6E-06					0.05
	Air	South Waterfront	Inhalation	Aluminum	1.4E-6	mg/m <sup>3</sup>	9.0E-09	(mg/m³)	NA NA	(ug/m³)-1		3.1E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000006
	1			Arsenic	2.2E-9	mg/m³	1.3E-11	(mg/m³)	4.3E-03	(ug/m³) <sup>-1</sup>	5.8E-11	4.7E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003
		1		Chromium VI	1.7E-9	mg/m³	1.1E-11	(mg/m³)	B.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	9.1E-10	3.8E-11	(mg/m³)	1.0E-04	(mg/m³)	3.8E-7
		1		Cobalt	2.2E-9	mg/m³	1.4E-11	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.2E-10	4.7E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000008
	ŀ	1		Iron	3.6E-6	mg/m³	2.4E-08	(mg/m³)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		8.3E-08	(mg/m³)	NA	(mg/m³)	
	1		Exp. Route Total								1.1E-09					0.00002
	1	Exposure Point Total									1.1E-09					0.00002
	Exposure Medium Total	1									1.1E-09					0.00002
Medium Total	<u> </u>			12 (1) 10 (1) (10 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)							2.7E-06					0.05
							-	Total o	Receptor Risks	Across All Media	2.7E-06		Total of Rec	eptor Hazards	Across All Media	0.05

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.4 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcule	itions			Non-Ca	ncer Hazard Ca	alculations	
		·	1 '	Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Aft	D/RfC	Hazard Quotlen
		i	1		-		Value	Units	Value	Units	1	Value	Units	Value	Units	ĺ
ubsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	3.8E-04	(mg/kg/day)	NÄ	(mg/kg/day)		2.7E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.03
				Arsenic	23.7	mg/kg	5.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	8.5E-07	4.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
			i	Chromium VI	19.1	mg/kg	4.6E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	2.3E-07	3.2E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.002
				Cobalt	23.8	mg/kg	5.7E-07	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		4.0E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01
	(	1	1	Iron	41,800	mg/kg	1.0E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		7.0E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.1
		1	Exp. Route Total		_						1.1E-06					0.3
			Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	23.7	mg/kg	5.1E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	7.7E-08	3.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	
				Cobalt	23.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	
				Iron	41,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total								7.7E-08	]				0.01
		Exposure Point Total		·			1				1.2E-06					0.3
	Exposure Medium Total	·									1.2E-06					0.3
	1íA	South Waterfront	Inhalation	Aluminum	0.011	mg/m <sup>3</sup>	1.9E-05	(mg/m³)	NA	(ug/m³)·1		1.3E-03	(mg/m³)	5.0E-03	(mg/m³)	0.3
		İ		Arsenic	1.7E-5	mg/m³	2.9E-08	(mg/m³)	4.3E-03	(ug/m³)·1	1.2E-07	2.0E-06	(mg/m³)	1.5€-05	(mg/m³)	0.1
				Chromium VI	1.4E-5	mg/m³	2.3E-08	(mg/m³)	8.4E-02	(ug/m³) <sup>-1</sup>	1.9E-06	1.6E-06	(mg/m³)	1.0E-04	(mg/m³)	0.02
		ļ		Cobalt	1.7E-5	rng/m³	2.9E-08	(mg/m³)	9.0E-03	(ug/m³)-1	2.6E-07	2.0E-06	(mg/m³)	2.0E-05	(mg/m <sup>3</sup> )	0.1
		1		Iron	0.030	mg/m <sup>3</sup>	5.1E-05	(mg/m³)	NA NA	(ug/m³) <sup>-1</sup>		3.5E-03	(mg/m³)	NA	(mg/m³)	
			Exp. Route Total								2.3E-06	1				0.5
		Exposure Point Total									2.3E-06	I				0.5
	Exposure Medium Total										2.3E-06					0.5
Medium Total											3.5E-06					0.8
								Total o	f Receptor Risks	Across All Media	3.5E-06		Total of Rec	eptor Hazards	Across All Media	0.8

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.5.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	tions	•		Non-Ca	ncer Hazard C	alculations	
	i i	· '	'	Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
							Value	Units	Value	Units	1	Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	1.7E-02	(mg/kg/day)	NA	(mg/kg/day)-1		2.0E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.2
				Arsenic	23.7	mg/kg	2.6E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.9E-05	3.0E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.0
			1	Chromium VI	19.1	mg/kg	1.1E-04	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	5.6E-05	2.4E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.08
				Cobalt	23.8	mg/kg	2.6E-05	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		3.0E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.0
				Iron	41,800	mg/kg	4.6E-02	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		5.3E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	8.0
			Exp. Route Total								9.5E-05					3.1
	ļ		Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>	**	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
	Ì		1	Arsenic	23.7	mg/kg	2.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.3E-06	2.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
			l	Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
			1	Cobalt	23.8	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	41,800	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total								3.3E-06					0.08
		Exposure Point Total									9.8E-05					3.2
	Exposure Medium Total					2000					9.8E-05					3.2
	Air	South Waterfront	Inhalation	Aluminum	1.4E-6	mg/m³	1.2E-07	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.4E-06	(mg/m <sup>3</sup> )	5.0E-03	(mg/m³)	0.0003
				Arsenic	2.2E-9	mg/m <sup>3</sup>	1.8E-10	(mg/m³)	4.3E-03	(ug/m³).1	7.6E-10	2.1E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001
				Chromium VI	1.7E-9	mg/m <sup>3</sup>	7.6E-10	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> )-1	6.4E-08	1.7E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002
				Cobalt	2.2E-9	mg/m³	1.8E-10	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.6E-09	2.1E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003
		1		Iron	3.8E-6	mg/m <sup>3</sup>	3.1E-07	(mg/m³)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		3.6E-06	(mg/m³)	NA	(mg/m³)	-
			Exp. Route Total								6.6E-08					8000.0
		Exposure Point Total									6.6E-08					0.0008
	Exposure Medium Total	·									6.6E-08					0.0008
Medium Total											9.8E-05					3.2
							• • • • • • • • • • • • • • • • • • • •	Total o	f Receptor Risks	Across All Media	9.8E-05		Total of Rec	eptor Hazards	Across All Media	3.2

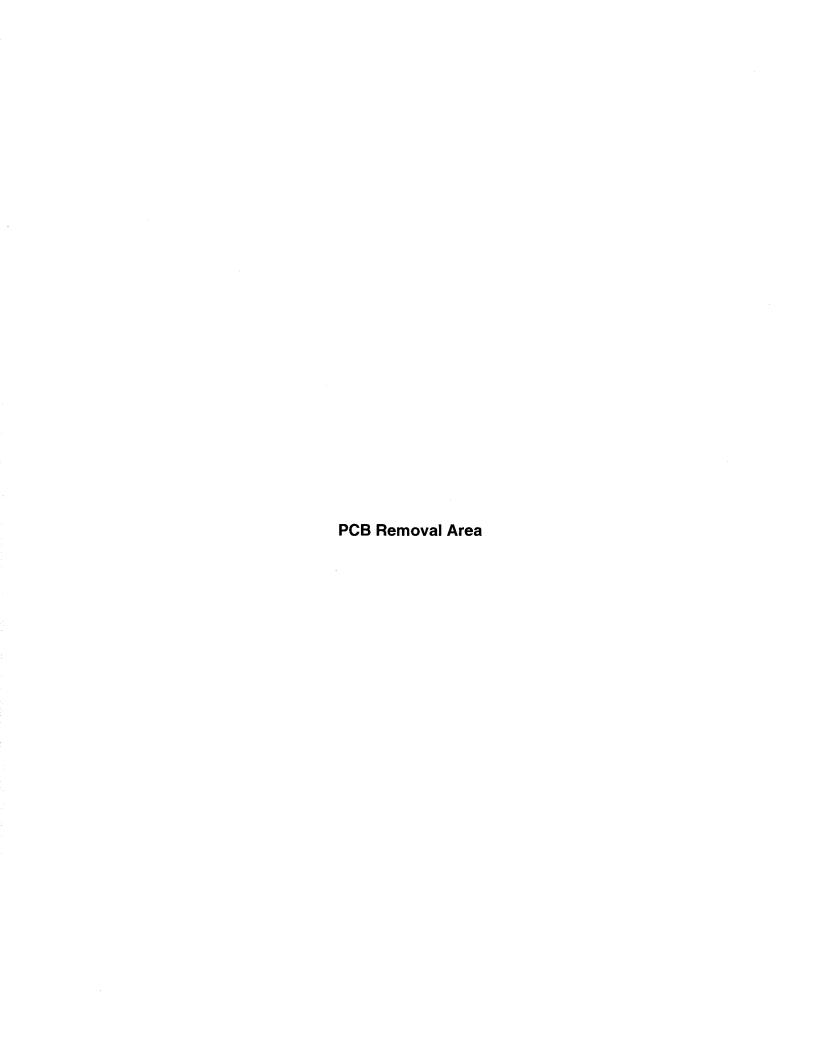
<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidence for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.6 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Ca	ncer Risk Calcula	tions			Non-Ca	ncer Hazard C	alculations	
1			İ	Potential Concern	Vatue	Units	Intake/Exposu	re Concentration	CSF/I	Jnit Risk	Cancer Risk	Intake/Exposur	e Concentration	Rf	D/RfC	Hazard Quotient
						1	Value	Units	Value	Units		Value	Units	Value	Units	1
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	7.4E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
				Arsenic	23.7	mg/kg	1.1E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)	1.7E-05	3.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
			-	Chromium VI	19.1	mg/kg	1.6E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	8.2E-06	2.6E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.009
				Cobalt	23.8	mg/kg	1.1E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>	'	3.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Iron	41,800	mg/kg	2.0E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		5.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.08
			Exp. Route Total	}	·						2.5E-05					0.3
			Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	23.7	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.0E-06	3.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	23.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	41,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			Exp. Route Total				J				2.0E-06					0.01
		Exposure Point Total					1				2.7E-05					0.3
	Exposure Medium Total			<u> </u>							2.7E-05					0.3
	Air	South Waterfront	Inhalation	Aluminum	1.4E-6	mg/m³	4.7E-07	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.4E-06	(mg/m³)	5.0E-03	(mg/m³)	0.0003
				Arsenic	2.2E-9	mg/m <sup>3</sup>	7.1E-10	(mg/m³)	4.3E-03	(ug/m³) <sup>-1</sup>	3.0E-09	2.1E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001
			ļ	Chromium VI	1.7E-9	mg/m <sup>3</sup>	1.0E-09	(mg/m³)	8.4E-02	(ug/m³)·1	8.8E-08	1.7E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002
				Cobalt	2.2E-9	mg/m <sup>3</sup>	7.1E-10	(mg/m³)	9.0E-03	(ug/m³) <sup>-1</sup>	6.4E-09	2.1E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003
				Iron	3.8E-6	mg/m <sup>3</sup>	1.2E-06	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		3.6E-06	(mg/m³)	NA	(mg/m <sup>3</sup> )	-
			Exp. Route Total								9.7E-08					0.0008
		Exposure Point Total									9.7E-08					0.0008
	Exposure Medium Total			**			1				9.7E-08					0.0008
Medium Total	T						1				2.7E-05					0.3
							"	Total	f Receptor Risks	Across All Media	2.7E-05		Total of Rec	plor Hazards	Across All Media	0.3

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



## LIST OF TABLES RAGS PART D TABLE 7 - PCB REMOVAL AREA CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

# Table No. Reasonable Maximum Exposures 7.1.RME Current Adolescent Trespassers - PCB Removal Area Current Adult Trespassers - PCB Removal Area Current Industrial Workers - PCB Removal Area Current Industrial Workers - PCB Removal Area Current Industrial Workers - PCB Removal Area Current Industrial Workers - PCB Removal Area Current/Future Adult Trespassers - PCB Removal Area Current/Future Construction Workers - North Waterfront Current/Future Construction Workers - North Waterfront Current/Future Construction Workers - North Waterfront Current/Future Construction Workers - North Waterfront Current/Future Construction Workers - North Waterfront Current/Future Construction Workers - North Waterfront Current/Future Construction Workers - North Waterfront Current/Future Construction Workers - North Waterfront Current Adolescent Trespassers - PCB Removal Area

# TABLE 7.1 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	li .	Car	icer Risk Calcula	tions			Non-Ca	ncer Hazard Ca	alculations	
***************************************				Potential Concern	Value	Units	Intake/Exposur	e Concentration		init Risk	Cancer Risk	Intake/Exposu	re Concentration		D/RfC	Hazard Quotien
		1			Value	l oillis	Value	Units	Value	Units	1 00	Value	Units	Value	Units	1
Surface Soil	Surface Soil	PCb Removal Area	Ingestion	Benzo(a)anthracene	0.130	mg/kg	1.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.1E-08	3.4E-08	(mg/kg/day)	NA	(mg/kg/day)	<del></del>
2011000 0011		1 00 110///04//	gov	Benzo(a)pyrene	0.120	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	9.9E-08	3.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.180	mg/kg	2.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.5E-08	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(g,h,i)perylene	0.072	mg/kg	2.7E-09	(mg/kg/day)	NA	(mg/kg/day)	1.52-00	1.9E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	6.3E-7
	1			Benzo(k)fluoranthene	0.072		9.7E-09		7.3E-02	1	7.1E-10	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	0.32-7
	ł					mg/kg	ll .	(mg/kg/day)		(mg/kg/day)		3.7E-08		NA NA		
	1			Chrysene	0.140	mg/kg	1.6E-08	(mg/kg/day)	7.3E-03	(mg/kg/day)	1.2E-10	11	(mg/kg/day)		(mg/kg/day)	
		1		Dibenzo(a,h)anthracene	0.017	mg/kg	2.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)	1.4E-08	4.6E-09	(mg/kg/day)	NA	(mg/kg/day)	
1				Indeno(1,2,3-cd)pyrene	0.071	mg/kg	8.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day)''	5.8E-09	1.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Total Aroclors	0.024	mg/kg	9.2E-10	(mg/kg/day)	2.0E+00	(mg/kg/day) '	1.8E-09	6.4E-09	(mg/kg/day)	NA	(mg/kg/day)	
			l .	Arsenic	21.7	mg/kg	8.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.2E-06	5.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Cobalt	22.7	mg/kg	8.5E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>	*-	6.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
			l	Iron	30,600	mg/kg	1.1E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		8.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
			l	Manganese	619	mg/kg	2.3E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.6E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.007
			Exp. Route Total	]			1				1.4E-06	l				0.06
			Dermal	Benzo(a)anthracene	0.130	mg/kg	4.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.1E-08	9.8E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.120	mg/kg	3.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	2.8E-07	9.0E-08	(mg/kg/day)	NA	(mg/kg/day)	
			ľ	Benzo(b)fluoranthene	0.180	mg/kg	5.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	4.2E-08	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	1
				Benzo(g,h,i)perylene	0.072	mg/kg	7.7E-09	(mg/kg/day)	NA	(mg/kg/day)	4.22.00	5.4E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000002
				Benzo(k)fluoranthene	0.072	mg/kg	2.8E-08	(mg/kg/day) (mg/kg/day)	7.3E-02		2.0E-09	6.5E-08	(mg/kg/day)	NA	(mg/kg/day)	0.000002
		1		1	1		4.5E-08		7.3E-02 7.3E-03	(mg/kg/day)	3.3E-10	1.1E-07		NA.	(mg/kg/day)	
				Chrysene	0.140	mg/kg	<b>II</b>	(mg/kg/day)		(mg/kg/day)	4.1E-08	1.1E-07 1.3E-08	(mg/kg/day)	NA NA		
				Dibenzo(a,h)anthracene	0.017	mg/kg	5.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)		II	(mg/kg/day)		(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.071	mg/kg	2.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.7E-08	5.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
			·	Total Aroclors	0.024	mg/kg	2.8E-09	(mg/kg/day)	2.0E+00	(mg/kg/day) <sup>-1</sup>	5.6E-09	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Arsenic	21.7	mg/kg	5.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	8.1E-07	3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
			1.	Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
			'	Iron	30,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	-
				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total				}				1.2E-06					0.01
		Exposure Point Total		<del>'</del>							2.6E-06					0.07
	Exposure Medium Total						(				2.6E-06					0.07
	Exposure Medidiff Total	PCb Removal Area	Inhalation	In(a)th	1.2E-11	13	1.1E-13	(3)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.2E-14	2.6E-13	I ((_3\	NA	(mg/m³)	0.01
	Air	PCD Hemovai Area	innaiation	Benzo(a)anthracene		mg/m³	II .	(mg/m³)			1	II .	(mg/m³)	NA.		1
			1	Benzo(a)pyrene	1.1E-11	mg/m <sup>3</sup>	1.0E-13	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> )-1	1.1E-13	2.4E-13	(mg/m³)		(mg/m³)	"
	1			Benzo(b)fluoranthene	1.6E-11	mg/m³	1.5E-13	(mg/m³)	1.1E-04	(ug/m³) <sup>-1</sup>	1.7E-14	3.6E-13	(mg/m³)	NA.	(mg/m³)	-
	1	1		Benzo(g,h,i)perylene	6.5E-12	mg/m³	2.0E-14	(mg/m³)	NA NA	(ug/m <sup>3</sup> ).1		1.4E-13	(mg/m³)	NA	(mg/m³)	
				Benzo(k)fluoranthene	7.8E-12	mg/m <sup>3</sup>	7.3E-14	(mg/m³)	1.1E-04	(ug/m³)·1	8.1E-15	1.7E-13	(mg/m³)	NA	(mg/m³)	
			1	Chrysene	1.3E-11	mg/m <sup>3</sup>	1.2E-13	(mg/m³)	1.1E-05	(ug/m <sup>3</sup> )-1	1.3E-15	2.8E-13	(mg/m³)	NA	(mg/m³)	
				Dibenzo(a,h)anthracene	1.6E-12	mg/m <sup>3</sup>	1.5E-14	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.8E-14	3.5E-14	(mg/m³)	NA	(mg/m³)	-
				Indeno(1,2,3-cd)pyrene	6.5E-12	mg/m <sup>3</sup>	6.1E-14	(mg/m³)	1.1E-04	(ug/m³)-1	6.7E-15	1,4E-13	(mg/m³)	NA	(mg/m³)	
	1			Total Aroclors	2.2E-12	mg/m <sup>3</sup>	6.9E-15	(mg/m <sup>3</sup> )	5.7E-04	(ug/m³)-1	4.0E-15	4.9E-14	(mg/m³)	NA	(mg/m³)	
			1	Arsenic	2.0E-9	mg/m³	6.2E-12	(mg/m <sup>3</sup> )	4.3E-03	(ug/m³)-1	2.7E-11	4.3E-11	(mg/m³)	1.5E-05	(mg/m <sup>a</sup> )	0.000003
				Cobalt	2.1E-9	mg/m³	6.5E-12	(mg/m³)	9.0E-03	(ug/m³)·1	5.8E-11	4.5E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000008
				Iron	2.8E-6	mg/m³	8.7E-09	(mg/m³)	NA	(ug/m <sup>3</sup> )·1		6.1E-08	(mg/m³)	NA	(mg/m³)	
	1		1	Manganese	5.6E-8	mg/m³	1.8E-10	(mg/m³)	NA.	(ug/m³).1		1.2E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00002
	J	į	Fire Davids Tabel	1	3.02-0	1119/111	1.02-10	(mg/m/		1 (dg/m/	8.5E-11	7.22 00	) (mg·m)	0.02.00	(mg·m)	0.00004
	1		Exp. Route Total				1									
		Exposure Point Total					<u> </u>			····	8.5E-11	<b>!</b>				0.00004
	Exposure Medium Total										8.5E-11					0.00004
Medium Total							1				2.6E-06	l .				0.07
modium rotal																

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.2.RME CALCULATION OF CHEMICAL CANGER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Surface Soil Surface S	ce Soil	PCB Removal Area	ingestion	Potential Concern  Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Indeno(1,2,3-d)pyrene Total Aroclors	Value  0 130 0 120 0 180 0 072 0 086 0 140 0 017 0 071	Units  mg/kg  mg/kg  mg/kg  mg/kg  mg/kg  mg/kg	Value 7.0E-09 6.4E-09 9.7E-09 3.9E-09 4.6E-09	e Concentration Units (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	Value 7.3E-01 7.3E+00 7.3E-01	(mg/kg/day) 1 (mg/kg/day) 1 (mg/kg/day) 1 (mg/kg/day) 1	Cancer Risk 5.1E-09 4.7E-08	Intake/Exposur Value 2.4E-08 2.3E-08	Units (mg/kg/day) (mg/kg/day)	Value NA NA	O/RIC Units (mg/kg/day) (mg/kg/day)	Hazard Quoties
urface Soil Surface	ce Soil	PCB Removal Area	Ingestion	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h.l)perylene Benzo(g,h.l)enel Benzo(s,h)luoranthene Chrysene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene Total Aroctors	0.120 0.180 0.072 0.086 0.140 0.017	mg/kg mg/kg mg/kg mg/kg mg/kg	7.0E-09 6.4E-09 9.7E-09 3.9E-09 4.6E-09	(mg/kg/day) (mg/kg/day) (mg/kg/day)	7.3E-01 7.3E+00 7.3E-01	(mg/kg/day) (mg/kg/day)	4.7E-08	2.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
urface Soil Surface	ce Soil	PCB Removal Area	Ingestion	Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h.l)perylene Benzo(g,h.l)enel Benzo(s,h)luoranthene Chrysene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene Total Aroctors	0.120 0.180 0.072 0.086 0.140 0.017	mg/kg mg/kg mg/kg mg/kg mg/kg	6.4E-09 9.7E-09 3.9E-09 4.6E-09	(mg/kg/day) (mg/kg/day)	7.3E+00 7.3E-01	(mg/kg/day) <sup>-1</sup>	4.7E-08					
				Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene Total Aroctors	0.180 0.072 0.086 0.140 0.017	mg/kg mg/kg mg/kg mg/kg	9.7E-09 3.9E-09 4.6E-09	(mg/kg/day)	7.3E-01	1		2.3E-08	(mg/kg/day)	NA i	(mn/kn/dav)	1
				Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene Total Aroctors	0.072 0.086 0.140 0.017	mg/kg mg/kg mg/kg	3.9E-09 4.6E-09			(markaldour)					(iligingruay)	
				Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene Total Aroclors	0.086 0.140 0.017	mg/kg mg/kg	4.6E-09	(ma/ka/day)		(mg/kg/day) <sup>-1</sup>	7.1E-09	3.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene Total Aroclors	0.140 0.017	mg/kg	1		NA	(mg/kg/day) <sup>-1</sup>	1	1.4E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	4.5E-7
		·		Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene Total Aroclors	0.017		FI .	(mg/kg/day)	7.3E-02	(mg/kg/day)	3.4E-10	1.6E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
		·		Indeno(1,2,3-cd)pyrene Total Aroclors			7.5E-09	(mg/kg/day)	7.3E-03	(mg/kg/day)-1	5.5E-11	2.6E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Total Aroclors	0.071	mg/kg	9.3E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	6.8E-09	3.3E-09	(mg/kg/day)	NA	(mg/kg/day)	-
					0.071	mg/kg	3.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	2.8E-09	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
					0.024	mg/kg	1.3E-09	(mg/kg/day)	2.0E+00	(mg/kg/day)	2.6E-09	4.6E-09	(mg/kg/day)	NA	(mg/kg/day)	
			1	Arsenic	21.7	mg/kg	1.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)	1.7E-06	4.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
			1	Cobalt	22.7	mg/kg	1.2E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				tron	30,600	mg/kg	1.6E-03	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		5.7E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.008
			1	Manganese	619	mg/kg	3.3E-05	(mg/kg/day)	NA	(mg/kg/day) 1	l 1	1.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005
			Exp. Route Total	1				, , , , , , , , , , , , , , , , , , , ,		· · · · · · · · · · · · · · · · · · ·	1.8E-06	į –				0.04
			Dermal	Benzo(a)anthracene	0.130	mg/kg	3.6E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.6E-09	1.3E-08	(mg/kg/day)	NA .	(mg/kg/day)	-
	- 1		1	Benzo(a)pyrene	0.120	mg/kg	3.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	2.4E-08	1.2E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.180	mg/kg	5.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.7E-09	1.8E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Benzo(g,h,l)perylene	0.072	mg/kg	2.0E-09	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		7.0E-09	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.3E-7
				Benzo(k)fluoranthene	0.086	mg/kg	2.4E-09	(mg/kg/day)	7.3E-02	(mg/kg/day) <sup>-1</sup>	1.7E-10	8.4E-09	(mg/kg/day)	NA	(mg/kg/day)	
	.			Chrysene	0.140	mg/kg	3.9E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	2.8E-11	1.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	Dibenzo(a,h)anthracene	0.017	mg/kg	4.8E-10	(mg/kg/day)	7.3E+00	(mg/kg/day)	3.5E-09	1.7E-09	(mg/kg/day)	NA	(mg/kg/day)	1
				Indeno(1,2,3-cd)pyrene	0.071	mg/kg	2.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.4E-09	6.9E-09	(mg/kg/day)	NA	(mg/kg/day)	l
			į.	Total Aroclors	0.024	mg/kg	7.3E-10	(mg/kg/day)	2.0E+00	(mg/kg/day)	1.5E-09	2.6E-09	(mg/kg/day)	NA	(mg/kg/day)	
			1	Arsenic	21.7	mg/kg	1.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	2.1E-07	4.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
			1	Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
			1	Iron	30.600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			i i	Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>	l l	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	1
			Exp. Route Total	1 Ivianganese	019	mg/kg	0.02+00	(mg/kg/day)	11/2	(ilig/kg/day)	2.5E-07	0.02700	(mg/ng/day)	0.02.01	(99.00)/	0.002
	te	Francis Balak Takat	Exp. Houle Total	<u> </u>							2.1E-06	<del></del>				0.002
		Exposure Point Total							<del></del>				<del></del>			
Exposu	osure Medium Total	<del></del>									2.1E-06		<del></del>			0.04
Air		PCB Removal Area	Inhalation	Benzo(a)anthracene	1.2E-11	mg/m³	7.4E-14	(mg/m³)	1.1E-04	(ug/m³)-1	8.1E-15	2.6E-13	(mg/m³)	NA	(mg/m³)	-
	ļ		1	Benzo(a)pyrene	1.1E-11	mg/m³	6.8E-14	(mg/m³)	1.1E-03	(ug/m³)-1	7.5E-14	2.4E-13	(mg/m³)	NA	(mg/m³)	
			1	Benzo(b)fluoranthene	1.6E-11	mg/m <sup>3</sup>	1.0E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>1</sup>	1.1E-14	3.6E-13	(mg/m³)	NA NA	(mg/m³)	
	j			Benzo(g,h,i)perylene	6.5E-12	mg/m <sup>3</sup>	4.1E-14	(mg/m <sup>3</sup> )	NA	{ug/m³).1		1.4E-13	(mg/m³)	NA.	(mg/m³)	
}				Benzo(k)fluoranthene	7.8E-12	mg/m³	4.9E-14	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) 1	5.4E-15	1.7E-13	(mg/m³)	NA NA	(mg/m³)	
1				Chrysene	1.3E-11	mg/m <sup>3</sup>	8.0E-14	(mg/m³)	1.1E-05	(ug/m³) <sup>-1</sup>	8.8E-16	2.8E-13	(mg/m³)	NA NA	(mg/m <sup>3</sup> )	
				Dibenzo(a,h)anthracene	1.6E-12	mg/m <sup>3</sup>	9.9E-15	(mg/m <sup>3</sup> )	1.2E-03	(ug/m³)-1	1.2E-14	3.5E-14	(mg/m³)	NA	(mg/m³)	
			1	Indeno(1,2,3-cd)pyrene	6.5E-12	mg/m³	4.0E-14	(mg/m³)	1.1E-04	(ug/m³) <sup>-1</sup>	4.4E-15	1.4E-13	(mg/m³)	NA NA	(mg/m <sup>3</sup> )	
l				Total Aroclors	2.2E-12	mg/m³	1,4E-14	(mg/m³)	5.7E-04	(ug/m³)·1	7.9E-15	4.9E-14	(mg/m³)	NA NA	(mg/m³)	
				Arsenic	2.0E-9	mg/m³	1.2E-11	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	5.3E-11	4.3E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003
				Cobalt	2.1E-9	mg/m³	1.3E-11	(mg/m³)	9.0E-03	(ug/m³) <sup>-1</sup>	1.2E-10	4.5E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000008
				Iron	2.8E-6	mg/m³	1.7E-08	(mg/m <sup>3</sup> )	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>	{	6.1E-08	(mg/m³)	NA NA	(mg/m³)	-
				Manganese	5.6E-8	mg/m³	3.5E-10	(mg/m <sup>3</sup> )	NA	(ug/m <sup>3</sup> )-1		1.2E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00002
			Exp. Route Total								1.7E-10					0.00004
	i	Exposure Point Total	<u> </u>								1.7E-10					0.00004
Exposi	osure Medium Total			<del></del>							1.7E-10					0.00004
Medium Total	Joseph Medicin Total			***************************************			<b></b>				2.1E-06					0.04
Medium Total							<u> </u>		Receptor Risks		2.1E-06 2.1E-06		Total of Rece			

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 7.3.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	tions			Non-Ca	ncer Hazard C		
				Potential Concern	Value	Units	Intake/Exposul	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration		D/RfC	Hazard Quo
			1				Value	Units	Value	Units		Value	Units	Value	Units	l
e Soil	Surface Soit	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.130	mg/kg	4.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.3E-08	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	
	ì		1 -	Benzo(a)pyrene	0.120	mg/kg	4.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.1E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	
			ł	Benzo(b)fluoranthene	0.180	mg/kg	6.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.6E-08	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	
			1	Benzo(g,h,i)perylene	0.072	mg/kg	2.5E-08	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		7.0E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00000
		l		Benzo(k)fluoranthene	0.086	mg/kg	3.0E-08	(mg/kg/day)	7.3E-02	(mg/kg/day) <sup>-1</sup>	2.2E-09	8.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.140	mg/kg	4.9E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	3.6E-10	1.4E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
	1		İ	Dibenzo(a,h)anthracene	0.017	mg/kg	6.1E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	4.4E-08	1.7E-08	(mg/kg/day)	NA.	(mg/kg/day)	-
	1			Indeno(1,2,3-cd)pyrene	0.071	mg/kg	2.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.8E-08	6.9E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Total Aroctors	0.024	mg/kg	8.5E-09	(mg/kg/day)	2.0E+00	(mg/kg/day) <sup>-1</sup>	1.7E-08	2.4E-08	(mg/kg/day)	NA.	(mg/kg/day)	-
				Arsenic	21.7	mg/kg	7.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.1E-05	2.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07
				Cobalt	22.7	mg/kg	7.9E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07
				Iron	30,600	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.0E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
			1	Manganese	619	mg/kg	2.2E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		6.1E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.00
			Exp. Route Total	1	•						1.2E-05	l			•	0.2
			Dermal	Benzo(a)anthracene	0.130	mg/kg	3.9E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.8E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.120	mg/kg	3.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	2.6E-07	1.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
			ŀ	Benzo(b)fluoranthene	0.180	mg/kg	5.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	3.9E-08	1.5E-07	(mg/kg/day)	NA.	(mg/kg/day)	
			ŀ	Benzo(g,h,i)perylene	0.072	mg/kg	2.2E-08	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		6.0E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000
				Benzo(k)fluoranthene	0.086	mg/kg	2.6E-08	(mg/kg/day)	7.3E-02	(mg/kg/day) 1	1.9E-09	7.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	0.140	mg/kg	4.2E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	3.1E-10	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	-
			1	Dibenzo(a,h)anthracene	0.017	mg/kg	5.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.8E-08	1.5E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	0.071	mg/kg	2.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.6E-08	6.0E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Total Aroclors	0.024	mg/kg	7.9E-09	(mg/kg/day)	2.0E+00	(mg/kg/day)	1.6E-08	2.2E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Arsenic	21.7	mg/kg	1.5E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.3E-06	4.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0
				Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	30,600	ma/ka	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			i	Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total	1				1 3 3 11		1 3 3 11	2.7E-06					0.0
		Exposure Point Total	Exp. House Folds	·							1.4E-05	i				0.2
	14 15 7 11	Exposure Form Total									1.4E-05				· · · · · · · · · · · · · · · · · · ·	0.2
	Exposure Medium Total	T	1	Ta	1 4 05 44	T 3	0.05.40	1	1.1E-04	1 44.301	1.1E-13	2.7E-12	(mg/m³)	NA NA	(mg/m³)	
	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.2E-11	mg/m <sup>3</sup>	9.6E-13	(mg/m³)	1.1E-04 1.1E-03	(ug/m³) <sup>-1</sup>	9.8E-13	2.7E-12 2.5E-12	(mg/m <sup>3</sup> )	NA NA	(mg/m <sup>3</sup> )	]
			i	Benzo(a)pyrene	1.1E-11	mg/m <sup>3</sup>	8.9E-13	(mg/m³)		(ug/m³)·1	9.8E-13	3.7E-12	1 ' " .'	NA NA	1 ' ' '	1
			1	Benzo(b)fluoranthene	1.6E-11	mg/m³	1.3E-12	(mg/m³)	1.1E-04	(ug/m³)-1	1	3.7E-12 1.5E-12	(mg/m³)	NA NA	(mg/m³)	
			1	Benzo(g,h,i)perylene	6.5E-12	mg/m <sup>3</sup>	5.3E-13	(mg/m³)	NA 1 1 5 04	(ug/m³)-1	7.0E-14	1.5E-12 1.8E-12	(mg/m³)	NA NA	(mg/m³)	
	1	1		Benzo(k)fluoranthene	7.8E-12	mg/m³	6.4E-13	(mg/m³)	1.1E-04 1.1E-05	(ug/m³) <sup>-1</sup>	1.1E-14	2.9E-12	(mg/m³)	NA NA	(mg/m³) (mg/m³)	
	1		1	Chrysene	1.3E-11	mg/m <sup>3</sup>	1.0E-12 1.3E-13	(mg/m³)	1.1E-05 1.2E-03	(ug/m³) <sup>-1</sup>	1.1E-14 1.5E-13	2.9E-12 3.6E-13	(mg/m³)	NA NA	1	
				Dibenzo(a,h)anthracene	1.6E-12	mg/m <sup>3</sup>		(mg/m³)		(ug/m³)-1	1.5E-13 5.8E-14	1.5E-12	(mg/m³)	NA NA	(mg/m³)	
		i i		Indeno(1,2,3-cd)pyrene	6.5E-12	mg/m³	5.3E-13	(mg/m³)	1.1E-04	(ug/m³)-1	1.0E-13	1.5E-12 5.1E-13	(mg/m³)	NA NA	(mg/m³)	1
		1		Total Aroclors	2.2E-12	mg/m³	1.8E-13	(mg/m³)	5.7E-04	(ug/m³) <sup>-1</sup>	1.0E-13 6.9E-10	5.1E-13 4.5E-10	(mg/m³)	1.5E-05	(mg/m³) (mg/m³)	0.000
			1	Arsenic	2.0E-9	mg/m³	1.6E-10	(rng/m <sup>3</sup> )	4.3E-03	(ug/m³)''	6.9E-10 1.5E-09	4.5E-10 4.7E-10	(mg/m³)	6.0E-06		0.000
		I		Cobalt	2.1E-9	mg/m <sup>3</sup>	1.7E-10	(mg/m³)	9.0E-03	(ug/m³)			(mg/m³)	NA	(mg/m³)	0.000
				Iron	2.8E-6	mg/m³	2.3E-07	(mg/m³)	NA NA	(ug/m³) 1		6.4E-07	(mg/m³)		(mg/m³)	0.00
				Manganese	5.6E-8	mg/m <sup>3</sup>	4.6E-09	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		1.3E-08	(mg/m³)	5.0E-05	(mg/m <sup>3</sup> )	
			Exp. Route Total								2.2E-09	J				0.00
		Exposure Point Total									2.2E-09	l				0.00
	Exposure Medium Total										2.2E-09	ļ				0.00

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.4 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	T F	PC	r	Car	ncer Risk Calcula	tions		1	Non-Ca	ncer Hazard Ca	alculations	1
Wediam	Expedition Middle III	Exposure / Onk		Potential Concern	Value	Units	Intake/Exposur	e Concentration		nit Risk	Cancer Risk	Intake/Exposu	re Concentration		D/RIC	Hazerd Quotient
					1 44,40	C.IIIS	Value	Units	Value	Units	0011001 111011	Value	Units	Value	Units	1
Surfece Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	6.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.7E-07	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)	
ounded com	Curiado con	1 05 110111040171100	ingustion.	Benzo(a)pyrene	4.92	ma/ka	5.5E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	4.0E-06	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	! I
				Benzo(b)fluoranthene	7.12	mg/kg	8.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) 1	5.9E-07	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(g,h,i)perylene	2.07	mg/kg	7.8E-08	(mg/kg/day)	NA.	(mg/kg/day)-1		5.4E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00002
	1			Benzo(k)fluoranthene	2.48	mg/kg	2.8E-07	(mg/kg/day)	7.3E-02	(mg/kg/day)	2.0E-08	6.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
	ļ		1	Chrysene	5.65	mg/kg	6.4E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	4.6E-09	1.5E-06	(mg/kg/day)	NA.	(mg/kg/day)	
	1			Dibenzo(a,h)anthracene	0.820	mg/kg	9.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	6.7E-07	2.2E-07	(mg/kg/day)	NA.	(mg/kg/day)	
	1			Indeno(1,2,3-cd)pyrene	2.07	mg/kg	2.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.7E-07	5.4E-07	(mg/kg/day)	NA.	(mg/kg/day)	
	1	ļ		Total Aroctors	0.416	mg/kg	1.6E-08	(mg/kg/day)	2.0E+00	(mg/kg/day) <sup>-1</sup>	3.1E-08	1.1E-07	(mg/kg/day)	NA.	(mg/kg/day)	
		[		Arsenic	21.8	ma/ka	8.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.2E-06	5.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Cobalt	22.7	mg/kg	8.5E-07	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		6.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
		1		Iron	32,000	mg/kg	1.2E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		8.4E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
				Manganese	619	mg/kg	2.3E-05	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.6E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.007
		}	Exp. Route Total	Manganood	1		- 5.52.55	(g.kg-day)		(mg/kg/day)	7.2E-06	1	(		1 (	0.06
}			Dermal	Benzo(a)anthracene	5.74	mg/kg	1.9E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.4E-06	4.3E-06	(mg/kg/day)	NA	(mg/kg/day)	
		1	Deimai	Benzo(a)pyrene	4.92	mg/kg	1.6E-06	(mg/kg/day)	7.3E+00	(mg/kg/day)	1.2E-05	3.7E-06	(mg/kg/day)	NA.	(mg/kg/day)	l I
				Benzo(b)fluorenthene	7.12	mg/kg	2.3E-06	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.7E-06	5.4E-06	(mg/kg/day)	NA.	(mg/kg/day)	l {
				Benzo(g,h,i)perylene	2.07	mg/kg	2.2E-07	(mg/kg/day)	NA NA	(mg/kg/day)	1.72-00	1.6E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00005
				Benzo(k)fluoranthene	2.48	mg/kg	8.0E-07	(mg/kg/day)	7.3E-02	(mg/kg/day) <sup>-1</sup>	5.8E-08	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	5.65	mg/kg	1.8E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.3E-08	4.3E-06	(mg/kg/day)	NA.	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.820	mg/kg	2.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.9E-06	6.2E-07	(mg/kg/day)	NA	(mg/kg/day)	
	1			Indeno(1,2,3-cd)pyrene	2.07	mg/kg	6.7E-07	(mg/kg/day)	7,3E-01	(mg/kg/day) <sup>-1</sup>	4.9E-07	1.6E-06	(mg/kg/day)	NA.	(mg/kg/day)	
				Total Aroclors	0.416	mg/kg	4.8E-08	(mg/kg/day)	2.0E+00	(mg/kg/day) <sup>-1</sup>	9.6E-08	3.4E-07	(mg/kg/day)	NA.	(mg/kg/day)	
				Arsenic	21.8	mg/kg	5.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	8.1E-07	3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	32,000	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total	l l	1	199		1 ()		(mg/kg/dd)/	1.8E-05	1	(		1 . 3 . 3	0.01
		Exposure Point Total	Exp. House Total	<u> </u>							2.5E-05		<del></del>			0.07
	C 24 5 740	Exposure Folini Total									2.5E-05					0.07
	Exposure Medium Total	1 non n	T 12.50	16	F 05 40	1 . 3	4.9E-12	3.	1.1E-04	4(_3 <sub>k</sub> -1	5.4E-13	1.1E-11	(mg/m³)	NA	1 //_3\	0.07
1	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	5.2E-10	mg/m³	11	(mg/m³)	1	(ug/m³)-1		II .		NA NA	(mg/m³)	
			i	Benzo(a)pyrene	4.5E-10	mg/m³	4.2E-12	(mg/m³)	1.1E-03	(ug/m³) 1	4.6E-12	9.8E-12	(mg/m³)	NA NA	(mg/m³)	
		ļ		Benzo(b)fluoranthene	6.5E-10	mg/m <sup>3</sup>	6.1E-12	(mg/m³)	1.1E-04	(ug/m³)-1	6.7E-13	1.4E-11 4.1E-12	(mg/m³)	NA NA	(mg/m³)	
		ĺ	1	Benzo(g,h,i)perylene	1.9E-10 2.3E-10	mg/m³	5.9E-13 2.1E-12	(mg/m³)	NA 1.1E-04	(ug/m³)-1	2.3E-13	4.1E-12 4.9E-12	(mg/m³)	NA NA	(mg/m³) (mg/m³)	
				Benzo(k)fluoranthene	1	mg/m³	n	(mg/m³)	1	(ug/m³)-1	5.3E-14	1.1E-11	(mg/m³)	NA NA	1 ' " .'	
				Chrysene	5.1E-10	mg/m³	4.8E-12	(mg/m³)	1.1E-05	(ug/m³) <sup>-1</sup>	8.4E-13	1.6E-11	(mg/m³)	NA NA	(mg/m³)	
		1		Dibenzo(a,h)anthracene	7.5E-11 1.9E-10	mg/m <sup>3</sup>	7.0E-13 1.8E-12	(mg/m³)	1.2E-03 1.1E-04	(ug/m³) <sup>-1</sup> (ug/m³) <sup>-1</sup>	1.9E-13	4.1E-12	(mg/m³)	NA NA	(mg/m³) (mg/m³)	
		1		Indeno(1,2,3-cd)pyrene Total Aroclors	1.9E-10 3.8E-11		1.8E-12 1.2E-13	(mg/m³)	5.7E-04	(ug/m²) 1 (ug/m³) 1	6.7E-14	8.3E-13	(mg/m³) (mg/m³)	NA NA	(mg/m²)	"
		1		Arsenic	2.0E-9	mg/m³	6.2E-12	(mg/m³)	4.3E-03		2.7E-14	4.3E-11	(mg/m <sup>-</sup> ) (mg/m <sup>3</sup> )	1.5E-05	(mg/m <sup>3</sup> )	0.000003
		1	ì	Arsenic Cobelt	2.0E-9 2.1E-9	mg/m <sup>3</sup>	6.5E-12	(mg/m³)	9.0E-03	(ug/m³) <sup>-1</sup> (ug/m³) <sup>-1</sup>	5.8E-11	4.5E-11	(mg/m <sup>-</sup> )	6.0E-06	(mg/m²)	0.000008
		1			2.1E-9 2.9E-6	mg/m <sup>3</sup>	9.1E-09	(mg/m³)	9.0E-03 NA		5.BE-11	6.4E-08	1 ' " - '	NA	(mg/m <sup>3</sup> )	0.000008
		1		Iron	5.6E-8	mg/m³	9.1E-09 1.8E-10	(mg/m³)	NA NA	(ug/m³)-1	l ::	1.2E-09	(mg/m³) (mg/m³)	5.0E-05	(mg/m <sup>-</sup> ) (mg/m <sup>3</sup> )	0.00002
			E- P-4-T-1	Manganese	5.6E-8	mg/m³	1.8E-10	(mg/m <sup>3</sup> )	INA	(ug/m³) <sup>-1</sup>		1.25.09	(mg/m·)	3.UE-U3	I (mg/m )	0.00002
			Exp. Floute Total	<u> </u>			<b> </b>				9.2E-11	<b></b>				
		Exposure Point Total					ļ				9.2E-11	<b>}</b>				0.00004
	Exposure Medium Total						<u></u>				9.2E-11					0.00004
Medium Total							J				2.5E-05	l				0.07

# TABLE 7.4.RME CALCULATION OF CHEMICAL CANCER HISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	tions			Non-Ca	ncer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/L	Init Risk	Cancer Risk	Intake/Exposu	re Concentration	At	D/RfC	Hazard Quotier
							Value	Units	Value	Units		Value	Units	Value	Units	1
surface Soil	Subsurface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.146	mg/kg	1.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>1</sup>	1.2E-08	3.8E-08	(mg/kg/day)	NA	(mg/kg/day)	
	1			Benzo(a)pyrene	0.167	mg/kg	1.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.4E-07	4.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.322	mg/kg	3.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.6E-08	8.5E-08	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.044	mg/kg	5.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.6E-08	1.2E-08	(mg/kg/day)	NA.	(mg/kg/day)	
			į	Aluminum	16,100	mg/kg	6.0E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.004
			i	Arsenic	35.0	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.0E-06	9.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
				Chromium VI	19.1	mg/kg	2.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	1.1E-06	5.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
				Cobalt	18.7	mg/kg	7.0E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>	]	4.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
	<u> </u>		1	tron	37,600	mg/kg	1.4E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		9.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
	1			Manganese	872	mg/kg	3.3E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.010
	İ		Exp. Route Total								3.3E-06					0.08
	ļ		Dermal	Benzo(a)anthracene	0.146	mg/kg	4.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.4E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	-
	1		1	Benzo(a)pyrene	0.167	mg/kg	5.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.9E-07	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	
	i		1	Benzo(b)fluoranthene	0.322	mg/kg	1.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	7.6E-08	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
	ſ		1	Dibenzo(a,h)anthracene	0.044	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.0E-07	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	
			İ	Aluminum	16,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
	<b>\</b>		1	Arsenic	35.0	mg/kg	8.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.3E-06	6.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
	ſ		j	Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
	1		1	Cobalt	18.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
			1	Iron	37,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	872	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	<u> </u>
			Exp. Route Total								1.9E-06	}				0.02
		Exposure Point Total		4							5.2E-06					0.10
	Exposure Medium Total	.1							-		5.2E-06					0.10
	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.3E-11	mg/m <sup>3</sup>	1.2E-13	(mg/m <sup>3</sup> )	1.1E-04	(ug/m <sup>3</sup> )-1	1.4E-14	2.9E-13	(mg/m³)	NA	(mg/m³)	
				Benzo(a)pyrene	1.5E-11	mg/m <sup>3</sup>	1.4E-13	(mg/m³)	1.1E-03	(ug/m³)-1	1.6E-13	3.3E-13	(mg/m³)	NA	(mg/m³)	-
				Benzo(b)fluoranthene	2.9E-11	rng/m <sup>3</sup>	2.7E-13	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	3.0E-14	6.4E-13	(mg/m³)	NA	(mg/m <sup>9</sup> )	
				Dibenzo(a,h)anthracene	4.0E-12	mg/m <sup>3</sup>	3.8E-14	(mg/m <sup>3</sup> )	1.2E-03	(ug/m³)-1	4.5E-14	8.8E-14	(mg/m³)	NA	(mg/m³)	
			1	Aluminum	1.5E-6	mg/m <sup>3</sup>	4.6E-09	(mg/m <sup>3</sup> )	NA	(ug/m³)-1		3.2E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000006
			İ	Arsenic	3.2E-9	mg/m <sup>3</sup>	1.0E-11	(mg/m <sup>3</sup> )	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	4.3E-11	7.0E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000005
				Chromium VI	1.7E-9	mg/m <sup>3</sup>	1.6E-11	(mg/m <sup>3</sup> )	8.4E-02	(ug/m³).1	1.4E-09	3.8E-11	(mg/m³)	1.0E-04	(mg/m³)	3.8E-7
				Cobalt	1.7E-9	mg/m³	5.3E-12	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ).1	4.8E-11	3.7E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000006
				Iron	3.4E-6	mg/m³	1.1E-08	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		7.5E-08	(mg/m <sup>3</sup> )	NA	(mg/m³)	
				Manganese	7.9E-8	mg/m <sup>3</sup>	2.5E-10	(mg/m³)	NA	(ug/m³)-'		1.7E-09	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	0.00003
			Exp. Route Total	1	•		1	· · · · · · · · · · · · · · · · · · ·	-		1.5E-09					0.00005
		Exposure Point Total					1				1.5E-09	1				0.00005
	Exposure Medium Total						·		<del></del>		1.5E-09					0.00005
	Expossio finediam rotar										5.2E-06					

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 7.5 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	É	PC	ſ	Car	ncer Risk Calculat	ions		]	Non-Ca	ncer Hazard C	alculations	
	1 '			Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/U	nit Risk	Cancer Risk	Intake/Exposur	e Concentration	Rf	D/RfC	Hazard Quotient
<u> </u>							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	3.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) 1	2.2E-07	1.1E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
				Benzo(a)pyrene	4.92	mg/kg	2.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	1.9E-06	9.2E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	7.12	mg/kg	3.8E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	2.8E-07	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	
	1	į		Benzo(g,h,i)perylene	2.07	mg/kg	1.1E-07	(mg/kg/day)	NA.	(mg/kg/day)		3.9E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00001
				Benzo(k)fluoranthene	2.48	mg/kg	1.3E-07	(mg/kg/day)	7.3E-02	(mg/kg/day) <sup>-1</sup>	9.7E-09	4.7E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	5.65	mg/kg	3.0E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	2.2E-09	1.1E-06	(mg/kg/day)	NA.	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.820	mg/kg	4.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.2E-07	1.5E-07	(mg/kg/day)	NA.	(mg/kg/day)	l i
l.		1		Indeno(1,2,3-cd)pyrene	2.07	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	8.1E-08	3.9E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
ļ				Total Aroclors	0.416	mg/kg	2.2E-08	(mg/kg/day)	2.0E+00	(mg/kg/day)-1	4.5E-08	7.8E-08	(mg/kg/day)	NA	(mg/kg/day)	
			1	Arsenic	21.8	mg/kg	1.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	1.8E-06	4.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
			i	Cobatt	22.7	mg/kg	1.2E-06	(mg/kg/day)	NA.	(mg/kg/day)-1		4.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
			1	Iron	32,000	mg/kg	1.7E-03	(mg/kg/day)	NA.	(mg/kg/day)-1		6.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.009
			j	Manganese	619	mg/kg	3.3E-05	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		1.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005
			Exp. Route Total	i -							4.6E-06	i				0.04
1			Dermal	Benzo(a)anthracene	5.74	mg/kg	1.6E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.2E-07	5.6E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
			]	Benzo(a)pyrene	4.92	mg/kg	1.4E-07	(mg/kg/day)	7.3E+00	(mg/kg/day).1	1.0E-06	4.8E-07	(mg/kg/day)	NA.	(mg/kg/day)	
			1	Benzo(b)fluoranthene	7.12	mg/kg	2.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.4E-07	6.9E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
			1	Benzo(g.h.i)perylene	2.07	ma/ka	5.8E-08	(mg/kg/day)	NA	(mg/kg/day)-1		2.0E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000007
<b>I</b>			1	Benzo(k)fluoranthene	2.48	mg/kg	6.9E-08	(mg/kg/day)	7.3E-02	(mg/kg/day) <sup>-1</sup>	5.0E-09	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	'
Į.		1		Chrysene	5.65	mg/kg	1.6E-07	(mg/kg/day)	7.3E-03	(mg/kg/day)	1.1E-09	5.5E-07	(mg/kg/day)	NA NA	(mg/kg/day)	}
				Dibenzo(a,h)anthracene	0.820	mg/kg	2.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	1.7E-07	8.0E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
A			}	Indeno(1,2,3-cd)pyrene	2.07	mg/kg	5.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)	4.2E-08	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
			}	Total Aroclors	0.416	mg/kg	1.2E-08	(mg/kg/day)	2.0E+00	(mg/kg/day) <sup>-1</sup>	2.5E-08	4.4E-08	(mg/kg/day)	NA.	(mg/kg/day)	
1		1	ł	Arsenic	21.8	mg/kg	1.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.1E-07	4.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
1			}	Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				Iron	32,000	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
<u> </u>		1		Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
		1	Exp. Route Total	Manganese	010	I mg/kg	0.02100	(ingrig cay)		(mg/kg/day)	1.7E-06	-	(99)/		1 (33);	0.002
li		Exposure Point Total	LXP. HOUSE TOTAL	l				• •			6.4E-06	<b>-</b>				0.04
		Exposure Point Total									6.4E-06	ļ		<del> </del>		0.04
	Exposure Medium Total		T : 1 : 12	In	T 5.05.40	1	205.40	3.	. 45.04	T 35-1		11511	T /3.	NA NA	1 (3)	0.04
l .	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	5.2E-10	mg/m³	3.3E-12	(mg/m³)	1.1E-04	(ug/m³)-1	3.6E-13	1.1E-11	(mg/m³)	NA NA	(mg/m³)	"
			1	Benzo(a)pyrene	4.5E-10	mg/m³	2.8E-12	(mg/m³)	1.1E-03	(ug/m³)-1	3.1E-12 4.5E-13	9.8E-12 1.4E-11	(mg/m³)	NA NA	(mg/m³)	-
1	}		1	Benzo(b)fluoranthene	6.5E-10	mg/m³	4.1E-12	(mg/m³)	1.1E-04 NA	(ug/m³) <sup>-1</sup>	4.5E-13	1.4E-11 4.1E-12	(mg/m³)	NA NA	(mg/m <sup>3</sup> )	
1				Benzo(g,h,l)perylene	1.9E-10	mg/m³	1.2E-12 1.4E-12	(mg/m³)	1.1E-04	(ug/m³) <sup>-1</sup>	1.6E-13	4.1E-12 4.9E-12	(mg/m³)	NA NA	(mg/m³)	-
1				Benzo(k)fluoranthene	2.3E-10	mg/m³	1.4E-12 3.2E-12	(mg/m³)	1.1E-04 1.1E-05	(ug/m³) <sup>-1</sup>	3.5E-14	1.1E-11	(mg/m³)	NA NA	(mg/m³)	
			İ	Chrysene	5.1E-10	mg/m³	3.2E-12 4.7E-13	(mg/m³)	1.1E-05 1.2E-03	(ug/m³) <sup>-1</sup> (ug/m³) <sup>-1</sup>	5.6E-13	1.6E-12	(mg/m³)	NA NA	(mg/m³)	
1				Dibenzo(a,h)anthracene	7.5E-11	mg/m <sup>3</sup>		(mg/m³)		( , , , , , ,		4.1E-12	(mg/m³)	NA NA	(mg/m³)	
1				Indeno(1,2,3-cd)pyrene	1.9E-10	mg/m³	1.2E-12	(mg/m³)	1.1E-04	(ug/m³)-1	1.3E-13	II	(mg/m³)	NA NA	(mg/m³)	
1				Total Aroclors	3.8E-11	mg/m³	2.4E-13	(mg/m³)	5.7E-04	(ug/m³) <sup>-1</sup>	1.3E-13	8.3E-13	(mg/m³)		(mg/m³)	0.000003
			1	Arsenic	2.0E-9	mg/m³	1.2E-11	(mg/m³)	4.3E-03	(ug/m³)-1	5.3E-11 1.2E-10	4.3E-11 4.5E-11	(mg/m³)	1.5E-05 6.0E-06	(mg/m³)	0.000003 0.000008
	1		1	Cobalt	2.1E-9	mg/m³	1.3E-11	(mg/m³)	9.0E-03	(ug/m³)-1	l	a	(mg/m³)		(mg/m³)	0.000008
	}		1	fron	2.9E-6	mg/m <sup>3</sup>	1.8E-08	(mg/m³)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		6.4E-08	(mg/m³)	NA COE OF	(mg/m³)	0.00002
	1			Manganese	5.6E-8	mg/m³	3.5E-10	(mg/m³)	NA	(ug/m³)-1		1.2E-09	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	
	1		Exp. Route Total								1.7E-10	ļ				0.00004
		Exposure Point Total									1.7E-10					0.00004
	Exposure Medium Total										1.7E-10					0.00004
Medium Total							1				6.4E-06					0.04

# TABLE 7.5 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	tions			Non-Ca	incer Hazard C	alculations	
	ĺ			Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposur	e Concentration	Rf	D/RfC	Hazard Quotier
			1				Value	Units	Value	Units		Value	Units	Value	Units	
ubsurface Soil	Subsurface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.146	mg/kg	7.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	5.7E-09	2.7E-08	(mg/kg/day)	NA	(mg/kg/day)	1-
				Benzo(a)pyrene	0.167	mg/kg	9.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	6.5E-08	3.1E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.322	mg/kg	1.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.3E-08	6.0E-08	(mg/kg/day)	NA	(mg/kg/day)	-
				Dibenzo(a,h)anthracene	0.044	mg/kg	2.4E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.7E-08	8.3E-09	(mg/kg/day)	NA	(mg/kg/day)	-
				Aluminum	16,100	mg/kg	8.6E-04	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		3.0E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
		ĺ	i	Arsenic	35.0	mg/kg	1.9E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.8E-06	6.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
		ĺ		Chromium VI	19.1	mg/kg	1.0E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	5.1E-07	3.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001
	<b>\</b>			Cobalt	18.7	mg/kg	1.0E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
		!		iron	37,600	mg/kg	2.0E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		7.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
				Manganese	872	mg/kg	4.7E-05	(mg/kg/day)	NA.	(mg/kg/day) <sup>-†</sup>		1.6E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.007
			Exp. Route Total								3.4E-06					0.05
		i	Dermal	Benzo(a)anthracene	0.146	mg/kg	4.1E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.0E-09	1.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
	1	İ		Benzo(a)pyrene	0.167	mg/kg	4.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.4E-08	1.6E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
	ł			Benzo(b)fluoranthene	0.322	mg/kg	9.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6.5E-09	3.1E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Dibenzo(á,h)anthracene	0.044	mg/kg	1.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	8.9E-09	4.3E-09	(mg/kg/day)	NA NA	(mg/kg/day)	
	ĺ			Aluminum	16,100	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
	i i			Arsenic	35.0	mg/kg	2.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.4E-07	7.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/đay)	0.003
	}			Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
	}			Cobalt	18.7	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0€-04	(mg/kg/day)	
		l		tron	37,600	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
		ľ		Manganese	872	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	<u> </u>
			Exp. Route Total								3.9E-07					0.003
		Exposure Point Total									3.8E-06					0.06
	Exposure Medium Total										3.8E-06					0.06
	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.3E-11	mg/m <sup>3</sup>	8.3E-14	(mg/m³)	1.1E-04	(ug/m³) <sup>-1</sup>	9.1E-15	2.9E-13	(mg/m³)	NA NA	(mg/m³)	
				Benzo(a)pyrene	1.5E-11	mg/m³	9.5E-14	(mg/m³)	1.1E-03	(ug/m³) <sup>-1</sup>	1.0E-13	3.3E-13	(mg/m³)	NA.	(mg/m³)	
				Benzo(b)fluoranthene	2.9E-11	mg/m³	1.8E-13	(mg/m <sup>3</sup> )	1.1E-04	(ug/m³) <sup>-1</sup>	2.0E-14	6.4E-13	(mg/m³)	NA NA	(mg/m³)	**
				Dibenzo(a,h)anthracene	4.0E-12	mg/m <sup>3</sup>	2.5E-14	(mg/m³)	1.2E-03	(ug/m³) <sup>-1</sup>	3.0E-14	8.8E-14	(mg/m³)	NA NA	(mg/m³)	-
				Aluminum	1.5E-6	mg/m <sup>3</sup>	9.2E-09	(mg/m <sup>3</sup> )	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		3.2E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000006
	ì			Arsenic	3.2E-9	mg/m³	2.0E-11	(mg/m³)	4.3E-03	(ug/m³) <sup>-1</sup>	8.6E-11	7.0E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000005
	ł			Chromium VI	1.7E-9	mg/m³	1.1E-11	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	9.1E-10	3.8E-11	(mg/m³)	1.0E-04	(mg/m³)	3.8E-7
	ł			Cobatt	1.7E-9	mg/m³	1.1E-11	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	9.6E-11	3.7E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000006
				Iron	3.4E-6	mg/m³	2.1E-08	(mg/m³)	NA.	(ug/m³) <sup>.1</sup>		7.5E-08	(mg/m³)	NA	(mg/m³)	
				Manganese	7.9E-8	mg/m³	5.0E-10	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.7E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00003
			Exp. Route Total								1.1E-09					0.00005
	- 1	Exposure Point Total									1.1E-09					0.00005

Notes

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.6.RME CALCULATION OF CHEMICAL CANCER HISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	1	Car	ncer Risk Calcula	tions		Ī	Non-Ca	ncer Hazard C	alculations	
Modalii				Potential Concern	Value	Units	Intake/Exposur	e Concentration		Jnit Risk	Cancer Risk	Inteke/Exposur	re Concentration		D/RfC	Hezard Quotient
					74,00	Cino	Value	Units	Value	Units		Value	Units	Value	Units	1
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	2.0E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.5E-06	5.6E-06	(mg/kg/day)	NA NA	(mg/kg/day)	·
Surface Soil	Surface Soil	1 OB Heliloval Alea	ingestion	Benzo(a)pyrene	4.92	mg/kg	1.7E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.3E-05	4.8E-06	(mg/kg/day)	NA.	(mg/kg/day)	
				Benzo(b)fluoranthene	7.12	ma/ka	2.5E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.8E-06	7.0E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
				Benzo(g,h,i)perylene	2.07	mg/kg	7.2E-07	(mg/kg/day)	NA NA	(mg/kg/day)	1.02-00	2.0E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00007
)l				Benzo(k)fluoranthene	2.48	mg/kg	8.7E-07	(mg/kg/day)	7.3E-02	(mg/kg/day)	6.3E-08	2.4E-06	(mg/kg/day)	NA NA	(mg/kg/day)	0.00007
1				Chrysene	5.65	mg/kg	2.0E-06	(mg/kg/day)	7.3E-02	(mg/kg/day)	1.4E-08	5.5E-06	(mg/kg/day)	NA.	(mg/kg/day)	
li .			Ì	Dibenzo(a,h)anthracene	0.820	mg/kg	2.9E-07	(mg/kg/day)	7.3E+00	(mg/kg/day)	2.1E-06	8.0E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
1				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	7.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	5.3E-07	2.0E-06	(mg/kg/day)	NA.	(mg/kg/day)	
				Total Aroclors	0.416	ma/kg	1.5E-07	(mg/kg/day)	2.0E+00	(mg/kg/day) <sup>-1</sup>	2.9E-07	4.1E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
				Arsenic	21.8	mg/kg	7.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.1E-05	2.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07
ı			1	Cobalt	22.7	mg/kg	7.9E-06	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>	1	2.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07
1				iron	32.000	mg/kg	1.1E-02	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		3.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
			1	Manganese	619	mg/kg	2.2E-04	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		6.1E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03
	}		Exp. Route Total	l		99		1 (99))		(	3.0E-05		()		(	0.2
			Dermai Dermai	Benzo(a)anthracene	5.74	mg/kg	1.7E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.3E-06	4.8E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
			Dennia	Benzo(a)pyrene	4.92	mg/kg	1.5E-06	(mg/kg/day)	7.3E+00	(mg/kg/day)	1.1E-05	4.1E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
i	i			Benzo(b)fluoranthene	7.12	mg/kg	2.1E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.6E-06	6.0E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
l	}			Benzo(g,h,i)perylene	2.07	mg/kg	6.2E-07	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>	1.02.00	1.7E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00006
				Benzo(k)fluoranthene	2.48	mg/kg	7.4E-07	(mg/kg/day)	7.3E-02	(mg/kg/day) <sup>-1</sup>	5.4E-08	2.1E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
Į.				Chrysene	5.65	mg/kg	1.7E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.2E-08	4.7E-06	(mg/kg/day)	l NA	(mg/kg/day)	
N.				Dibenzo(a,h)anthracene	0.820	mg/kg	2.5E-07	(mg/kg/day)	7.3E+00	(mg/kg/day)	1.8E-06	6.9E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
i	1			Indeno(1,2,3-cd)pyrene	2.07	mg/kg	6.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.5E-07	1.7E-06	(mg/kg/day)	NA.	(mg/kg/day)	]
1				Total Aroclors	0.416	mg/kg	1.3E-07	(mg/kg/day)	2.0E+00	(mg/kg/day) <sup>-1</sup>	2.7E-07	3.8E-07	(mg/kg/day)	NA.	(mg/kg/day)	
1				Arsenic	21.8	mg/kg	1.5E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	2.3E-06	4.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
1				Iron	32,000	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
1				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>	l	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	l
			Exp. Route Total	Manganese	0.0	1 119119	0.02+00	(mg/ng/day)	1.0.1	(mg/kg/day/	1.8E-05		1 ()		(33//	0.01
l)	1 1	Exposure Point Total	Exp. Flodie Total	<u> </u>			<b></b>				4.9E-05					0.2
1	F M 11 T 11	Exposure Point Total					<del></del>	·			4.9E-05			4 18		0.2
1	Exposure Medium Total	DOD 0	T character	In	T 505 40		105.11	1 / / 3	1 45 04	3-1		1.05.10	T (i3)	I NA	I (3\	<del></del>
B .	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	5.2E-10	mg/m³	4.3E-11	(mg/m³)	1.1E-04	(ug/m³) <sup>-1</sup>	4.7E-12 4.0E-11	1.2E-10 1.0E-10	(mg/m³)	NA NA	(mg/m³)	
	1			Benzo(a)pyrene	4.5E-10	mg/m³	3.6E-11	(mg/m³)	1.1E-03	(ug/m³) <sup>-1</sup>	4.0E-11 5.8E-12	li .	(mg/m³)	NA NA	(mg/m³)	
				Benzo(b)fluoranthene	6.5E-10	mg/m³	5.3E-11	(mg/m³)	1.1E-04	(ug/m³) <sup>-1</sup>	5.8E-12	1.5E-10 4.3E-11	(mg/m³)	NA NA	(mg/m³)	
				Benzo(g,h,l)perylene	1.9E-10 2.3E-10	mg/m <sup>3</sup>	1.5E-11 1.8E-11	(mg/m³)	NA 1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup> (ug/m <sup>3</sup> ) <sup>-1</sup>	2.0E-12	4.3E-11 5.1E-11	(mg/m³)	NA NA	(mg/m³)	
				Benzo(k)fluoranthene	5.1E-10	mg/m³	4.2E-11	(mg/m³)	1.1E-04 1.1E-05		4.6E-13	1.2E-10	(mg/m³)	NA NA	(mg/m³)	
Ì				Chrysene	7.5E-11	mg/m³	4.2E-11 6.1E-12	(mg/m³)	1.1E-05 1.2E-03	(ug/m³)-1 (ug/m³)-1	7.3E-12	1.7E-10	(mg/m³)	NA NA	(mg/m³)	
				Dibenzo(a,h)anthracene		mg/m <sup>3</sup>		(mg/m³)	1.1E-04		1.7E-12	4.3E-11	(mg/m³)	NA NA	(mg/m³)	
		Ì		Indeno(1,2,3-cd)pyrene Total Aroclors	1.9E-10 3.8E-11	mg/m³	1.5E-11 3.1E-12	(mg/m³)	1.1E-04 5.7E-04	(ug/m³)·¹ (ug/m³)·¹	1.7E-12 1.8E-12	8.6E-12	(mg/m³) (mg/m³)	NA NA	(mg/m³) (mg/m³)	
			l	Arsenic	2.0E-9	mg/m³	1.6E-10	(mg/m³)	4.3E-03		6.9E-10	4.5E-10	(mg/m³)	1.5E-05	(mg/m³) (mg/m³)	0.00003
		l		Cobalt	2.0E-9 2.1E-9	mg/m³	1.7E-10	(mg/m³) (mg/m³)	9.0E-03	(ug/m³) <sup>-1</sup> (ug/m³) <sup>-1</sup>	1.5E-09	4.7E-10	(mg/m <sup>3</sup> )	6.0E-06	(mg/m <sup>3</sup> )	0.00003
					2.1E-9 2.9E-6	mg/m³	2.4E-07	, , ,	9.0E-03		1,5E-09	6.6E-07	(mg/m <sup>3</sup> )	NA	(mg/m <sup>3</sup> )	0.00008
				Iron Manganese	5.6E-8	mg/m³	2.4E-07 4.6F-09	(mg/m³) (mg/m³)	NA NA	(ug/m³)·1 (ug/m³)·1		1.3E-08	(mg/m <sup>-</sup> ) (mg/m <sup>3</sup> )	5.0E-05		0.0003
		l	Fire Banda Tiller	Iwanganese	5.55-8	mg/m³	4.65-09	[ (mg/m <sup>-</sup> )	I NA	T (nahu.)	2.3F-09	1.35-08	(mg/m )	3.05-05	(mg/m³)	0.0003
			Exp. Route Total	I			<b></b>					<b></b>				
		Exposure Point Total					<b> </b>				2.3E-09					0.0004
	Exposure Medium Total										2.3E-09					0.0004
Medium Total							<u> </u>				4.9E-05	J				0.2

## TABLE 7.6.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	1	Car	ncer Risk Calcula	itions			Non-Ce	ancer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposur	e Concentration	Rf	D/RfC	Hazerd Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.146	mg/kg	5.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.7E-08	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.167	mg/kg	5.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	4.3E-07	1.6E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.322	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	8.2E-08	3.2E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.044	mg/kg	1.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.1E-07	4.3E-08	(mg/kg/day)	NA NA	(mg/kg/day)	1
			i	Aluminum	16,100	mg/kg	5.6E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.6E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
				Arsenic	35.0	mg/kg	1.2E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.8E-05	3.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Chromium VI	19.1	mg/kg	6.7E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	3.3E-06	1.9E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006
		Į.		Cobalt	18.7	mg/kg	6.5E-06	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06
			1	iron	37,600	mg/kg	1.3E-02	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		3.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.05
				Manganese	872	mg/kg	3.0E-04	(mg/kg/day)	NA .	(mg/kg/day) <sup>-1</sup>		8.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04
	1		Exp. Route Total								2.2E-05					0.3
			Dermal	Benzo(a)anthracene	0.146	mg/kg	4.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.2E-08	1.2E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
			1	Benzo(a)pyrene	0.167	mg/kg	5.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.7E-07	1.4E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
	ł		1	Benzo(b)fluoranthene	0.322	mg/kg	9.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	7.0E-08	2.7E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
	j			Dibenzo(a,h)anthracene	0.044	mg/kg	1.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	9.6E-08	3.7E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
	1		1	Aluminum	16,100	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
	1			Arsenic	35.0	mg/kg	2.4E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.6E-06	6.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
			1	Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
	1		1	Cobalt	18.7	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				iron	37,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
			<u> </u>	Manganese	872	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total								4.2E-06					0.02
		Exposure Point Total									2.7E-05					0.3
	Exposure Medium Total										2.7E-05					0.3
	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.3E-11	mg/m³	1.1E-12	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.2E-13	3.0E-12	(mg/m³)	NA	(mg/m³)	
			}	Benzo(a)pyrene	1.5E-11	mg/m <sup>3</sup>	1.2E-12	(mg/m³)	1.1E-03	(ug/m³)-1	1.4E-12	3.5E-12	(mg/m³)	NA NA	(mg/m <sup>3</sup> )	
		1		Benzo(b)fluoranthene	2.9E-11	mg/m³	2.4E-12	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.6E-13	6.7E-12	(mg/m³)	NA	(mg/m³)	
			i	Dibenzo(a,h)anthracene	4.0E-12	mg/m <sup>3</sup>	3.3E-13	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-13	9.1E-13	(mg/m³)	NA NA	(mg/m³)	
				Aluminum	1.5E-6	mg/m³	1.2E-07	(mg/m³)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		3.3E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00007
				Arsenic	3.2E-9	mg/m³	2.6E-10	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1,1E-09	7.3E-10	(mg/m³)	1.5E-05	(mg/m³)	0.00005
				Chromium VI	1.7E-9	mg/m <sup>3</sup>	1.4E-10	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.2E-08	4.0E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000004
				Cobalt	1.7E-9	mg/m <sup>3</sup>	1.4E-10	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> )-1	1.2E-09	3.9E-10	(mg/m³)	6.0E-06	(mg/m³)	0.00006
				Iron	3.4E-6	mg/m <sup>3</sup>	2.8E-07	(mg/m³)	NA NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		7.8E-07	(mg/m³)	NA	(mg/m³)	
1				Manganese	7.9E-8	mg/m <sup>3</sup>	6.5E-09	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		1.8E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0004
			Exp. Route Total	<u> </u>							1.4E-08	ļ				0.0005
		Exposure Point Total									1.4E-08	<u> </u>				0.0005
	Exposure Medium Total										1.4E-08					0.0005
Medium Total											2.7E-05					0.3

Notes

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplementel Guidence for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 7.7.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	cer Risk Calcula	itions		Ī	Non-Ca	ncer Hazard Ca	alculations	
	1			Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rft	D/RfC	Hazard Quotie
	ĺ					1	Value	Units	Value	Units		Value	Units	Value	Units	1
face Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	1.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1E-07	9.6E-06	(mg/kg/day)	NΑ	(mg/kg/day)	
	1			Benzo(a)pyrene	4.92	mg/kg	1.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	9E-07	8.3E-06	(mg/kg/day)	NA	(mg/kg/day)	
	1		ľ	Benzo(b)fluoranthene	7.12	mg/kg	1.7E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	1E-07	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)	
	1			Benzo(g,h,i)perylene	2.07	mg/kg	5.0E-08	(mg/kg/day)	N <b>A</b>	(mg/kg/day)-1		3.5E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.0001
	1	!		Benzo(k)fluoranthene	2.48	mg/kg	6.0E-08	(mg/kg/day)	7.3E-02	(mg/kg/day)	4E-09	4.2E-06	(mg/kg/day)	NA	(mg/kg/day)	
	i			Chrysene	5.65	mg/kg	1.4E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1E-09	9.5E-06	(mg/kg/day)	NA	(mg/kg/day)	
	1		1	Dibenzo(a,h)anthracene	0.820	mg/kg	2.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1E-07	1.4E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	5.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4E-08	3.5E-06	(mg/kg/day)	NA	(mg/kg/day)	-
				Total Aroctors	0.416	mg/kg	1.0E-08	(mg/kg/day)	2.0E+00	(mg/kg/day) <sup>-1</sup>	2E-08	7.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
	1			Arsenic	21.8	mg/kg	5.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	8E-07	3.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Cobalt	22.7	mg/kg	5.4E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01
				Iron	32,000	mg/kg	7.7E-04	(mg/kg/day)	NΑ	(mg/kg/day) <sup>-1</sup>		5.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.08
				Manganese	619	mg/kg	1.5E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.0E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04
			Exp. Route Total								2E-06	]				0.2
			Dermal	Benzo(a)anthracene	5.74	mg/kg	5.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4E-08	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	
	{			Benzo(a)pyrene	4.92	mg/kg	4.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	3E-07	3.2E-06	(mg/kg/day)	NA	(mg/kg/day)	
	1			Benzo(b)fluoranthene	7.12	mg/kg	6.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	5E-08	4.7E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
	1			Benzo(g,h,i)perylene	2.07	mg/kg	1.9E-08	(mg/kg/day)	NA	(mg/kg/day)-1		1.4E-06	(mg/kg/đay)	3.0E-02	(mg/kg/day)	0.0000
	1	ŀ		Benzo(k)fluoranthene	2.48	mg/kg	2.3E-08	(mg/kg/day)	7.3E-02	(mg/kg/day)	2E-09	1.6E-06	(mg/kg/day)	NA	(mg/kg/day)	
	1			Chrysene	5.65	mg/kg	5.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day)-1	4E-10	3.7E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.820	mg/kg	7.7E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	6E-08	5.4E-07	(mg/kg/day)	NA	(mg/kg/day)	
	1			indeno(1,2,3-cd)pyrene	2.07	mg/kg	1.9E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1E-08	1.4E-06	(mg/kg/day)	NA	(mg/kg/day)	
	1	1	1	Total Aroclors	0.416	mg/kg	4.2E-09	(mg/kg/day)	2.0E+00	(mg/kg/day) <sup>-1</sup>	8E-09	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	
			i	Arsenic	21.8	mg/kg	4.7E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	7E-08	3.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
	1	ľ		Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	
				iron	32,000	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total								5E-07					0.01
	1	Exposure Point Total								·	3E-06	l				0.2
	Exposure Medium Total	<u> </u>									3E-06					0.2
	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	4.1E-6	mg/m³	7.0E-09	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	8E-10	4.9E-07	(mg/m³)	NA	(mg/m³)	
	T			Benzo(a)pyrene	3.5E-6	mg/m³	6.0E-09	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> )-1	7E-09	4.2E-07	(mg/m³)	NA	(mg/m <sup>3</sup> )	
	1			Benzo(b)fluoranthene	5.1E-6	mg/m³	8.7E-09	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	1E-09	6.1E-07	(mg/m³)	NA	(mg/m³)	
				Benzo(g,h,i)perylene	1.5E-6	mg/m <sup>3</sup>	2.6E-09	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		1.8E-07	(mg/m³)	NA	(mg/m³)	
			į.	Benzo(k)fluoranthene	1.8E-6	mg/m <sup>3</sup>	3.1E-09	(mg/m³)	1.1E-04	(ug/m³)-1	3E-10	2.1E-07	(mg/m³)	NA	(mg/m³)	
				Chrysene	4.0E-6	mg/m³	6.8E-09	(mg/m³)	1.1E-05	(ug/m³)-1	7E-11	4.8E-07	(mg/m³)	NA	(mg/m <sup>3</sup> )	
				Dibenzo(a,h)anthracene	5.9E-7	mg/m³	1.0E-09	(mg/m <sup>3</sup> )	1.2E-03	(ug/m³)-1	1E-09	7.0E-08	(mg/m³)	NA	(mg/m³)	
	1		1	Indeno(1,2,3-cd)pyrene	1.5E-6	mg/m³	2.6E-09	(mg/m <sup>3</sup> )	1.1E-04	(ug/m³)-1	3E-10	1.8E-07	(mg/m³)	NA	(mg/m³)	
	1	1	1	Total Aroclors	3.0E-7	mg/m³	5.1E-10	(mg/m³)	5.7E-04	(ug/m³)-1	3E-10	3.6E-08	(mg/m³)	NA	(mg/m³)	
			1	Arsenic	1.6E-5	mg/m³	2.7E-08	(mg/m³)	4.3E-03	(ug/m³)	1E-07	1.9E-06	(mg/m³)	1.5E-05	(mg/m³)	0.1
	1		1	Cobalt	1.6E-5	mg/m³	2.7E-08	(mg/m³)	9.0E-03	(ug/m³).1	2E-07	1.9E-06	(mg/m³)	2.0E-05	(mg/m <sup>3</sup> )	0.1
	1	I	1						NA.			2.7E-03	(mg/m³)	NA	(mg/m <sup>3</sup> )	
	1		1	Iron	0.023	mg/m <sup>3</sup>	3.9E-05	(mg/m³)	NA.	(ug/m³)-1		2.7 E-03	i (movin:i	INA.	(movm)	

Exp. Route Total

Exposure Point Total

Exposure Medium Total

Medium Total

3E-07

3E-07 3E-07

3E-06

## TABLE 7.7.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	itions	-		Non-Ca	ıncer Hazard C	alculations	
		1		Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	1
Subsurface Soil	Subsurface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.146	mg/kg	3.5E-09	(mg/kg/day)	7.3E-01	{mg/kg/day)-1	3E-09	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	
			ŀ	Benzo(a)pyrene	0.167	mg/kg	4.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	3E-08	2.8E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.322	mg/kg	7.7E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6E-09	5.4E-07	(mg/kg/day)	NA.	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.044	mg/kg	1.1E-09	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	8E-09	7.4E-08	(mg/kg/day)	NA	(mg/kg/day)	
		ł		Aluminum	16,100	mg/kg	3.9E-04	(mg/kg/day)	NA	(mg/kg/day)-1		2.7E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.03
	1		1	Arsenic	35.0	mg/kg	8.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1E-06	5.9E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.2
			1	Chromium VI	19.1	mg/kg	4.6E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	2E-07	3.2E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	
	1	İ	1	Cobalt	18.7	mg/kg	4.5E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01
	1			Iron	37,600	mg/kg	9.0E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		6.3E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.09
	]			Manganese	872	mg/kg	2.1E-05	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.5E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.06
	i		Exp. Route Total								1E-06					0.4
	ì		Dermal	Benzo(a)anthracene	0.146	mg/kg	1.4E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1E-09	9.6E-08	(mg/kg/day)	NA	(mg/kg/day)	
		ĺ	1	Benzo(a)pyrene	0.167	mg/kg	1.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1E-08	1.1E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
			1	Benzo(b)fluoranthene	0.322	mg/kg	3.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2E-09	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	
		(	1	Dibenzo(a,h)anthracene	0.044	mg/kg	4.1E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3E-09	2.9E-08	(mg/kg/day)	NA NA	(mg/kg/day)	
				Aluminum	16,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	35.0	mg/kg	7.6E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1E-07	5.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	
				Cobalt	18.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	
				Iron	37,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	872	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	<u></u>
			Exp. Route Total								1E-07					0.02
		Exposure Point Total									1E-06					0.4
	Exposure Medium Total										1E-06					0.4
	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.0E-7	mg/m³	1.7E-10	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	2E-11	1.2E-08	(mg/m³)	NA	(mg/m³)	
			1	Benzo(a)pyrene	1.2E-7	mg/m³	2.0E-10	(mg/m³)	1.1E-03	(ug/m³)-1	2E-10	1.4E-08	(mg/m³)	NA	(mg/m <sup>3</sup> )	
	ĺ	1		Benzo(b)fluoranthene	2.3E-7	mg/m³	3.9E-10	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	4E-11	2.7E-08	(mg/m³)	NA.	(mg/m³)	
				Dibenzo(a,h)anthracene	3.1E-8	mg/m <sup>3</sup>	5.3E-11	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> )-1	6E-11	3.7E-09	(mg/m³)	NA	(mg/m³)	
		1		Aluminum	0.012	mg/m <sup>3</sup>	2.0E-05	(mg/m <sup>3</sup> )	NA NA	(ug/m <sup>3</sup> )-1		1.4E-03	(mg/m³)	5.0E-03	(mg/m <sup>3</sup> )	0.3
				Arsenic	2.5E-5	mg/m <sup>3</sup>	4.3E-08	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> )-1	2E-07	3.0E-06	(mg/m³)	1.5E-05	(mg/m <sup>3</sup> )	0.2
			1	Chromium VI	1.4E-5	mg/m³	2.4E-08	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	2E-06	1.7E-06	(mg/m <sup>3</sup> )	1.0E-04	(mg/m³)	0.02
				Cobalt	1.3E-5	mg/m <sup>3</sup>	2.2E-08	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> )-1	2E-07	1.5E-06	(mg/m³)	2.0E-05	(mg/m³)	0.08
				Iron	0.027	mg/m³	4.6E-05	(mg/m³)	NA	(ug/m³)-1		3.2E-03	(mg/m³)	NA.	(mg/m³)	
				Manganese	6.2E-4	mg/m³	1.1E-06	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		7.4E-05	(mg/m³)	5.0E-05	(mg/m³)	11
			Exp. Route Total		•		1				2E-06			•	<u> </u>	2
		Exposure Point Total									2E-06					2
	Exposure Medium Total							· · · · · · · · · · · · · · · · · · ·			2E-06					2

3E-06

Notes

Medium Total

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 7.8.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Całcula	tions			Non-Ca	ncer Hazard C	alculations	
		·		Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Init Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfl	D/RfC	Hazard Quotien
							Value	Units	Value	Units	1	Value	Units	Value	Units	
urface Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	3.4E-05	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.4E-05	7.3E-05	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	4.92	mg/kg	2.9E-05	(mg/kg/day)	7.3E+00	(mg/kg/day) 1	2.1E-04	6.3E-05	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	7.12	mg/kg	4.2E-05	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	3.0E-05	9.1E-05	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(g,h,i)perylene	2.07	mg/kg	2.3E-06	(mg/kg/day)	NA.	(mg/kg/day)-1		2.6E-05	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.0009
				Benzo(k)fluoranthene	2.48	mg/kg	1.4E-05	(mg/kg/day)	7.3E-02	(mg/kg/day) <sup>-1</sup>	1.1E-06	3.2E-05	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	5.65	ma/kg	3.3E-05	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	2.4E-07	7.2E-05	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.820	mg/kg	4.8E-06	(mg/kg/day)	7.3E+00	(mg/kg/day)	3.5E-05	1.0E-05	(mg/kg/day)	NA	(mg/kg/day)	
			1	Indeno(1,2,3-cd)pyrene	2.07	ma/ka	1.2E-05	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	8.8E-06	2.6E-05	(mg/kg/day)	NA	(mg/kg/day)	
			1	Total Aroclors	0.416	ma/kg	4.6E-07	(mg/kg/day)	2.0E+00	(mg/kg/day) <sup>-1</sup>	9.1E-07	5.3E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Arsenic	21.8	mg/kg	2.4E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.6E-05	2.8E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.9
	1			Cobalt	22.7	ma/ka	2.5E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.9E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.0
	ì			Iron	32,000	mg/kg	3.5E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.1E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.6
				Manganese	619	mg/kg	6.8E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		7.9E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.3
	1		Exp. Route Total	,				1		(55//	3.5E-04		1		1	2.8
	1		Dermal Dermal	Benzo(a)anthracene	5.74	mg/kg	1.2É-05	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	8.9E-06	2.7E-05	(mg/kg/day)	NA	(mg/kg/day)	
	1		Dermai	Benzo(a)pyrene	4.92	mg/kg	1.0E-05	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	7.6E-05	2.3E-05	(mg/kg/day)	NA.	(mg/kg/day)	l
				Benzo(b)fluoranthene	7.12	mg/kg	1.5E-05	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	1.1E-05	3.3E-05	(mg/kg/day)	NA	(mg/kg/day)	l
			1	Benzo(g,h,i)perylene	2.07	mg/kg	8.3E-07	(mg/kg/day)	NA NA	(mg/kg/day)	1.12.00	9.6E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.0003
				Benzo(k)fluoranthene	2.48	mg/kg	5.3E-06	(mg/kg/day)	7.3E-02	(mg/kg/day) <sup>-1</sup>	3.9E-07	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)	
				Chrysene	5.65	mg/kg	1.2E-05	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	6.8E-08	2.6€-05	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.820	mg/kg	1.7E-06	(mg/kg/day)	7.3E+00	(mg/kg/day)	1.3E-05	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	4.4E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.2E-06	9.6E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Total Aroclors	0.416	mg/kg	1.8E-07	(mg/kg/day)	2.0E+00	(mg/kg/day)	3.6E-07	2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	l
				Arsenic	21.8	ma/ka	2.0E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)	3.0E-06	2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
			ļ	Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	0.02.00	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	
				fron	32,000	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
	ì		Exp. Route Total	IMANGANESE	019	ilig/kg	0.02400	(mg/kg/day)		(//ig/kg/day)	1,2E-04	0.02+00	(rig/kg/ddy)	3.00.04	(mg/kg/day)	0.08
	· l		Exp. Houle Total	<u> </u>							4.6E-04					2.9
		Exposure Point Total											<del></del>			
	Exposure Medium Total				<del></del>	<del></del>					4.6E-04				1	2.9
	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	5.2E-10	mg/m³	2.3E-10	(mg/m³)	1.1E-04	(ug/m³)-1	2.5E-11	5.0E-10	(mg/m³)	NA	(mg/m³)	
		1	Ļ	Benzo(a)pyrene	4.5E-10	mg/m³	2.0E-10	(mg/m³)	1.1E-03	(ug/m³)·1	2.2E-10	4.3E-10	(mg/m³)	NA.	(mg/m³)	
				Benzo(b)fluoranthene	6.5E-10	mg/m <sup>3</sup>	2.8E-10	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> )-1	3.1E-11	6.2E-10	(mg/m³)	NA	(mg/m <sup>3</sup> )	
			i	Benzo(g,h,i)perylene	1.9E-10	mg/m <sup>3</sup>	1.5E-11	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.8E-10	(mg/m³)	NA	(mg/m³)	
				Benzo(k)fluoranthene	2.3E-10	mg/m <sup>3</sup>	9.9E-11	(mg/m <sup>3</sup> )	1.1E-04	(ug/m³)-1	1.1E-11	2.2E-10	(mg/m³)	NA	(mg/m³)	-
				Chrysene	5.1E-10	mg/m³	2.3E-10	(mg/m <sup>3</sup> )	1.1E-05	(ug/m³)·1	2.5E-12	4.9E-10	(mg/m³)	NA	(mg/m³)	-
	1	1	1	Dibenzo(a,h)anthracene	7.5E-11	mg/m³	3.3E-11	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.9E-11	7.1E-11	(mg/m³)	NA	(mg/m³)	* *
	}	1	1	Indeno(1,2,3-cd)pyrene	1.9E-10	mg/m <sup>3</sup>	8.2E-11	(mg/m³)	1.1E-04	(ug/m³)·1	9.1E-12	1.8E-10	(mg/m³)	NA	(mg/m³)	-
			l .	Total Aroctors	3.8E-11	mg/m <sup>3</sup>	3.1E-12	(mg/m³)	5.7E-04	(ug/m³) <sup>-1</sup>	1.8E-12	3.6E-11	(mg/m³)	NA	(mg/m³)	
		1	1	Arsenic	2.0E-9	mg/m³	1.6E-10	(mg/m <sup>3</sup> )	4.3E-03	(ug/m³).1	7.0E-10	1.9E-09	(mg/m³)	1.5E-05	(mg/m <sup>3</sup> )	0.0001
		1		Cobalt	2.1E-9	mg/m³	1.7E-10	(mg/m <sup>3</sup> )	9.0E-03	(ug/m³)-1	1.5E-09	2.0E-09	(mg/m³)	6.0E-06	(mg/m <sup>3</sup> )	0.0003
				Iron	2.9E-6	mg/m <sup>3</sup>	2.4E-07	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.8E-06	(mg/m³)	NA	(mg/m³)	
				Manganese	5.6E-8	mg/m <sup>3</sup>	4.6E-09	(mg/m³)	NA	(ug/m³)·1		`5.4E-08	(mg/m³)	5.0E-05	(mg/m³)	0.001
			Exp. Route Total								2.6E-09					0.002
		Exposure Point Total									2.6E-09					0.002
	Exposure Medium Total										2.6E-09	)				0.002

# TABLE 7.8.FME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Catcula	tions			Non-Ca	ncer Hazard C	alculations	
	1			Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/L	Jnit Filsk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotier
							Value	Units	Value	Units		Value	Units	Value	Units	1
ibsurface Soit	Subsurface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.146	mg/kg	8.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	6.2E-07	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)	T
	1			Benzo(a)pyrene	0.167	mg/kg	9.8E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	7.1E-06	2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	0.322	mg/kg	1.9E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) '	1.4E-06	4.1E-06	(mg/kg/day)	NA	(mg/kg/day)	-
		1		Dibenzo(a,h)anthracene	0.044	mg/kg	2.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.9E-06	5.6E-07	(mg/kg/day)	NA	(mg/kg/day)	
		1		Aluminum	16,100	mg/kg	1.8E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.1E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.2
				Arsenic	35.0	mg/kg	3.8E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	5.8E-05	4.5E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.5
		1		Chromium VI	19.1	mg/kg	1.1E-04	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	5.6E-05	2.4E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.08
			i	Cobalt	18.7	mg/kg	2.0E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.4E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.8
				Iron	37,600	mg/kg	4.1E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.8E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.7
				Manganese	872	mg/kg	9.6E-04	(mg/kg/day)	NA	(mg/kg/day)		1.1E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.5
			Exp. Route Total								1.2E-04					3.7
			Dermal	Benzo(a)anthracene	0.146	mg/kg	3.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)	2.3E-07	6.8E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	0.167	mg/kg	3.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day)	2.6E-06	7.8E-07	(mg/kg/day)	NA.	(mg/kg/day)	]
				Benzo(b)fluoranthene	0.322	mg/kg	6.9E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	5.0E-07	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.044	mg/kg	9.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	6.8E-07	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	
				Aluminum	16,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	35.0	mg/kg	3.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	4.8E-06	3.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
				Cobalt	18.7	mg/kg	0.0E+ <b>0</b> 0	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	-
				Iron	37,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	-
		1		Manganese	872	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
	{		Exp. Route Total								8.8E-06					0.1
		Exposure Point Total	•								1.3E-04					3.9
	Exposure Medium Total										1.3E-04	[				3.9
	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.3E-11	mg/m <sup>3</sup>	5.8E-12	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.4E-13	1.3E-11	(mg/m³)	NA	(mg/m³)	-
	}			Benzo(a)pyrene	1.5E-11	mg/m <sup>3</sup>	6.7E-12	(mg/m³)	1.1E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	7.3E-12	1.5E-11	(mg/m³)	NA	(mg/m³)	
	}	İ		Benzo(b)fluoranthene	2.9E-11	mg/m <sup>3</sup>	1.3E-11	(mg/m³)	1.1E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.4E-12	2.8E-11	(mg/m³)	NA	(mg/m³)	
				Dibenzo(a,h)anthracene	4.0E-12	mg/m³	1.8E-12	(mg/m³)	1.2E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.1E-12	3.8E-12	(mg/m³)	NA	(mg/m³)	
	1			Aluminum	1.5E-6	mg/m³	1.2E-07	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		1.4E-06	(mg/m³)	5.0E-03	(mg/m³)	0.0003
	}	ĺ		Arsenic	3.2E-9	mg/m³	2.6E-10	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> )-1	1.1E-09	3.1E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0002
	1			Chromium VI	1.7E-9	mg/m³	7.6E-10	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	6.4E-08	1.7E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002
		i		Cobalt	1.7E-9	mg/m <sup>a</sup>	1.4E-10	(mg/m³)	9.0E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.3E-09	1.6E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003
				Iron	3.4E-6	mg/m <sup>3</sup>	2.8E-07	(mg/m³)	NA	(ug/m³)-1		3.3E-06	(mg/m <sup>3</sup> )	NA	(mg/m³)	
				Manganese	7.9E-8	mg/m³	6.5E-09	(mg/m³)	NA	(ug/m³)-1		7.6E-08	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	0.002
			Exp. Route Total								6.6E-08					0.002
		Exposure Point Total									6.6E-08					0.002
	Exposure Medium Total										6.6E-08					0.002
Medium Total											1.3E-04	<b></b>				3.9

Notes

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 7.9. RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVISTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	ations			Non-Ca	incer Hazard C	alculations	
	1	·		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/I	Unit Risk	Cancer Risk	Intake/Exposur	re Concentration	Rf	D/RfC	Hazard Quotie
	1					Ì	Value	Units	Value	Units	1	Value	Units	Value	Units	1
face Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	4.9E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	3.6E-06	7.9E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(a)pyrene	4.92	mg/kg	4.2E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	3.1E-05	6.7E-06	(mg/kg/day)	NA	(mg/kg/day)	
				Benzo(b)fluoranthene	7.12	mg/kg	6.1E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	4.5E-06	9.8E-06	(mg/kg/day)	NA.	(mg/kg/day)	
				Benzo(g,h,i)perylene	2.07	mg/kg	9.7E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.8E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00009
	1		1	Benzo(k)fluoranthene	2.48	mg/kg	2.1E-06	(mg/kg/day)	7.3E-02	(mg/kg/day) <sup>-1</sup>	1.6E-07	3.4E-06	(mg/kg/day)	NA	(mg/kg/day)	
	1			Chrysene	5.65	mg/kg	4.9E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	3.6E-08	7.7E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
	í			Dibenzo(a,h)anthracene	0.820	mg/kg	7.1E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	5.2E-06	1.1E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	1.8E-06	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	1.3E-06	2.8E-06	(mg/kg/day)	NA NA	(mg/kg/day)	-
		1		Total Aroclors	0.416	mg/kg	2.0E-07	(mg/kg/day)	2.0E+00	(mg/kg/day)-1	3.9E-07	5.7E-07	(mg/kg/day)	NA	(mg/kg/day)	
			1	Arsenic	21.8	mg/kg	1.0E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.5E-05	3.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.10
			1	Cobalt	22.7	mg/kg	1.1E-05	(mg/kg/day)	NA	(mg/kg/day)-1		3.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
			1	Iron	32,000	mg/kg	1.5E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06
			1	Manganese	619	mg/kg	2.9E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		8.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04
			Exp. Floute Total								6.1E-05					0.3
			Dermal	Benzo(a)anthracene	5.74	mg/kg	2.6E-06	(mg/kg/day)	7.3E-01	(mg/kg/day)	1.9E-06	4.1E-06	(mg/kg/day)	NA	(mg/kg/day)	
			,	Benzo(a)pyrene	4.92	mg/kg	2.2E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) <sup>-1</sup>	1.6E-05	3.5E-06	(mg/kg/day)	NA NA	(mg/kg/day)	-
			1	Benzo(b)fluoranthene	7.12	mg/kg	3.2E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) <sup>-1</sup>	2.3E-06	5.1E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
			1	Benzo(g,h,i)perylene	2.07	mg/kg	5.0E-07	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.5E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00005
			1	Benzo(k)fluoranthene	2.48	mg/kg	1.1E-06	(mg/kg/day)	7.3E-02	(mg/kg/day) <sup>-1</sup>	8.1E-08	1.8E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
				Chrysene	5.65	mg/kg	2.5E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) <sup>-1</sup>	1.8E-08	4.0E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
				Dibenzo(a,h)anthracene	0.820	mg/kg	3.7E-07	(mg/kg/day)	7.3E+00	(mg/kg/day)-1	2.7E-06	5.8E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
	1			Indeno(1,2,3-cd)pyrene	2.07	mg/kg	9.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)-1	6.7E-07	1.5E-06	(mg/kg/day)	NA NA	(mg/kg/day)	
				Total Aroclors	0.416	mg/kg	1.1E-07	(mg/kg/day)	2.0E+00	(mg/kg/day) <sup>-1</sup>	2.2E-07	3.2E-07	(mg/kg/day)	NA NA	(mg/kg/day)	
				Arsenic	21.8	mg/kg	1.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	1.8E-06	3.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	-
			l .	Iron	32,000	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	
				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day).1		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total								2.6E-05					0.01
		Exposure Point Total				•••					8.7E-05					0.3
	Exposure Medium Total										8.7E-05					0.3
	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	5.2E-10	mg/m <sup>3</sup>	3.1E-10	(mg/m³)	1.1E-04	(ug/m³)·1	3.5E-11	5.0E-10	(mg/m³)	NA NA	(mg/m³)	-
	C"	1 OB Hellioval Alea	ii iii alatoii	Benzo(a)pyrene	4.5E-10	mg/m³	2.7E-10	(mg/m³)	1.1E-03	(ug/m³)-1	3.0E-10	4.3E-10	(mg/m³)	NA.	(mg/m <sup>3</sup> )	
	1		ì	Benzo(b)fluoranthene	6.5E-10	mg/m³	3.9E-10	(mg/m³)	1.1E-04	(ug/m³)·1	4.3E-11	6.2E-10	(mg/m³)	NA.	(mg/m³)	
	1			Benzo(g,h,i)perylene	1.9E-10	mg/m³	6.2E-11	(mg/m³)	NA	(ug/m³)-1		1.8E-10	(mg/m³)	NA.	(mg/m³)	1
				Benzo(k)fluoranthene	2.3E-10	mg/m <sup>3</sup>	1.4E-10	(mg/m³)	1.1E-04	(ug/m³)-1	1.5E-11	2.2E-10	(mg/m <sup>3</sup> )	NA	(mg/m³)	
			l.	Chrysene	5.1E-10	mg/m <sup>3</sup>	3.1E-10	(mg/m³)	1.1E-05	(ug/m³)-1	3.4E-12	4.9E-10	(mg/m³)	NA	(mg/m³)	
				Dibenzo(a,h)anthracene	7.5E-11	mg/m <sup>3</sup>	4.5E-11	(mg/m³)	1.2E-03	(ug/m³)-1	5.4E-11	7.1E-11	(mg/m³)	NA.	(mg/m³)	i
				Indeno(1,2,3-cd)pyrene	1.9E-10	mg/m³	1.1E-10	(mg/m³)	1.1E-04	(ug/m³)-1	1.2E-11	1.8E-10	(mg/m³)	NA	(mg/m³)	
			i	Total Aroclors	3.8E-11	mg/m³	1.2E-11	(mg/m³)	5.7E-04	(ug/m <sup>3</sup> ) <sup>-1</sup>	7.1E-12	3.6€-11	(mg/m <sup>3</sup> )	NA NA	(mg/m³)	l
			1	Arsenic	2.0E-9	mg/m³	6.5E-10	(mg/m³)	4.3E-03	(ug/m³)-1	2.8E-09	1.9E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001
			1	Cobalt	2.1E-9	mg/m³	6.8E-10	(mg/m³)	9.0E-03	(ug/m³)-1	6.1E-09	2.0E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003
	}		1	Iron	2.9E-6		9.6E-07	(mg/m³)	NA	(ug/m³)-1	0.12-03	2.8E-06	(mg/m³)	NA	(mg/m³)	
	}		1	Manganese	5.6E-8	mg/m³ mg/m³	1.9E-08	(mg/m <sup>3</sup> )	NA NA	(ug/m³)-1		5.4E-08	(mg/m³)	5.0E-05	(mg/m³)	0.001
	}		Fire Davida Total	Ivianganese	3.0E-6	mg/m	1.96.08	i (my/m)		(ug/iii)	9.4E-09	3.72.00	(1119/111 )	5.5E-55	(119/01)	0.002
	1		Exp. Route Total				<del> </del>					<del></del>		···		0.002
		Exposure Point Total					11				9.4E-09	II.				n 0.002
	Exposure Medium Total	LADOSGI 9 T OIRE TOTAL		· · · · · · · · · · · · · · · · · · ·				~		-	9.4E-09	<del></del>			<del></del>	0.002

## TABLE 7.9. RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Adult

Exposure Medium Exposure Point Exposure Route Chemical of Cancer Risk Calculations Non-Cancer Hazard Calculations Potential Concern Value Units Intake/Exposure Concentration CSF/Unit Risk Cancer Risk Intake/Exposure Concentration RfD/RfC Hazard Quotient Unlis Units Value Units Value Value Subsurface Soil Subsurface Soil PCB Removal Area Ingestion Benzo(a)anthracene 1.3E-07 (mg/kg/day) 7.3E-01 9.2E-08 2.0E-07 (mg/kg/day) mg/kg (mg/kg/day) (mg/kg/day) 0.167 1.0E-06 2.3E-07 NA Benzo(a)pyrene mg/kg 1.4E-07 (mg/kg/day) 7.3E+00 (mg/kg/day) (mg/kg/day) (ma/ka/day) Benzo(b)fluoranthene 0.322 mg/kg 2.8E-07 (mg/kg/day) 7.3E-01 2.0E-07 4.4E-07 (mg/kg/day) NA (mg/kg/day) (mg/kg/day) Dibenzo(a.h)anthracene 0.044 mg/kg 3.8E-08 (mg/kg/day) 7.3E+00 (mg/kg/day) 2.8E-07 6.0E-08 (mg/kg/day) NA (ma/ka/dav) 16,100 7.6E-03 2.2E-02 (mg/kg/day) 1.0E+00 (mg/kg/day) 0.02 Aluminum mg/kg (mg/kg/day) (mg/kg/day) 2.5F-05 3.0E-04 0.2 Arsenic 35.0 mg/kg 1 6F-05 (mg/kg/day) 1.5F+00 (mg/kg/day)-1 4.BE-05 (mg/kg/day) (mg/kg/day) Chromium VI 19.1 1.6E-05 5.0E-01 8.2E-06 2.6E-05 3.0E-03 0.009 mg/kg (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) 2.6E-05 3.0E-04 0.09 Cobal! 18.7 mg/kg 8.8E-06 (mg/kg/day) NA (mg/kg/day) (mg/kg/day) (mg/kg/day) 37,600 1.8E-02 5.2E-02 7.0E-01 (mg/kg/day) 0.07 mg/kg (mg/kg/day) (mg/kg/day) (ma/ka/day) 872 4.1E-04 NA 1.2E-03 2.4E-02 0.05 Manganese mg/kg (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) Exp. Route Total 3.5E-05 0.4 Dermal Benzo(a)anthracene 0.146 mg/kg 6.5E-08 (mg/kg/day) 7.3E-01 4.8E-08 1.0E-07 (mg/kg/day) (mg/kg/day) (ma/ka/day) Benzo(a)pyrene 0.167 mg/kg 7.5E-08 (mg/kg/day) 7.3E+00 (mg/kg/day) 5 4F-07 1 2F-07 (mg/kg/day) NA (mg/kg/day) Benzo(b)fluoranthene 0.322 1.4E-07 (mg/kg/day) 7.3E-01 1.0E-07 2.3E-07 (mg/kg/day) (mg/kg/day) mg/kg (mg/kg/day) Dibenzo(a,h)anthracene 0.044 mg/kg 2.0E-08 (mg/kg/day) 7.3E+00 (mg/kg/day)<sup>-1</sup> 1.4E-07 3.1F-08 (mg/kg/day) NA (mg/kg/day) 16,100 0.0E+00 0.0E+00 1.0E+00 Aluminum mg/kg (mg/kg/day) NA (mg/kg/day) (mg/kg/day) (mg/kg/day) Arsenic 35.0 mg/kg 2.0E-06 (mg/kg/day) 1.5E+00 (mg/kg/day) 3.0E-06 5.7F-06 (mg/kg/day) 3 0F-04 (mg/kg/day) 0.02 Chromium VI 19.1 0.0E+00 (mg/kg/day) 2.0E+01 0.0E+00 (mg/kg/day) 7.5E-05 (mg/kg/day) ma/ka (mg/kg/day) Cobalt 18.7 mg/kg 0.0E+00 (mg/kg/day) NA (mg/kg/day) 0.0E+00 (mg/kg/day) 3.0E-04 (mg/kg/day) 37,600 0.0E+00 NA 0.0E+00 7.0E-01 Iron ma/ka (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) Manganese 872 mg/kg 0.0E+00 (mg/kg/day) NA 0.0E+00 (mg/kg/day) 9.6E-04 (mg/kg/day) (mg/kg/day) 3.8E-06 Exp. Boute Total 0.02 3.8E-05 0.4 Exposure Point Total 3.8E-05 0.4 Exposure Medium Total PCB Removal Area Inhalation Benzo(a)anthracene 8.0E-12 1.1E-04 8.8E-13 1.3E-11 (ma/m<sup>3</sup> ma/m (ma/m<sup>3</sup>) (ua/m³) (ma/m<sup>3</sup>) Benzo(a)pyrene 1.5E-11 mg/m<sup>3</sup> 9.2E-12 (mg/m<sup>3</sup>) 1.1F-03 (ug/m<sup>3</sup>)-1 1.0E-11 1.5E-11 (mg/m<sup>3</sup>) NA (mg/m³) 2.8E-11 NA Benzo(b)fluoranthene 2.9E-11 mg/m<sup>3</sup> 1.8E-11 (mg/m³) 1.1E-04 (ug/m<sup>3</sup>) 1.9E-12 (mg/m<sup>3</sup>)  $(mg/m^3)$ 3.8E-12 Dibenzo(a,h)anthracene 4.0E-12 mg/m<sup>3</sup> 2.4E-12 (mg/m³) 1.2E-03 (ug/m<sup>3</sup>) 2.9E-12 (mg/m<sup>3</sup>) NA (mg/m<sup>3</sup>) (ug/m<sup>3</sup>)-1 1.4E-06 5.0E-03 0.0003 Aluminum 1.5E-6 4.8E-07 NA (ma/m<sup>3</sup>)  $(ma/m^3)$ mg/m<sup>3</sup> /ma/m<sup>3</sup>) Arsenic 3.2E-9 mg/m<sup>3</sup> 1 DF-09 (mg/m³) 4.3F-03 (ug/m<sup>3</sup>)-4.5F-09 3.1E-09 (mg/m³) 1.5E-05  $(mg/m^3)$ 0.0002 (ug/m³) 1.7E-09 1.0E-04 0.00002 Chromium VI 1.7E-9 1.0E-09 8.4E-02 8.8E-08 (mg/m<sup>3</sup>) (mg/m<sup>3</sup>) mg/m<sup>3</sup> (mg/m<sup>3</sup>) Cobalt 1.7E-9 mg/m<sup>3</sup> 5.6E-10 9.0E-03 (ug/m<sup>3</sup>) 5.0E-09 1 6F-09 (mg/m<sup>3</sup>) 6.0E-06  $(mg/m^3)$ 0.0003 (mg/m<sup>3</sup>) (ug/m³) 3.4E-6 1.1E-06 3.3E-06 (ma/m³) NΑ (ma/m³) (mg/m<sup>3</sup>) NA Iron mg/m<sup>3</sup> (ug/m<sup>3</sup>)<sup>-1</sup> Manganese 7.9E-8 2.6E-08 NA 7.6E-08 (mg/m³) 5.0E-05 (mg/m<sup>3</sup>) 0.002 mg/m<sup>3</sup> (mg/m<sup>3</sup>) Exp. Route Total 9.7E-08 0.002 9.7E-08 0.002 Exposure Point Total Exposure Medium Total 9.7E-08 0.002 Medium Total 3.8E-05

Notes:

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### RAGS Part D Table 9

Summary of Receptor Risks and Hazards for COPCs

**North Waterfront** 

#### LIST OF TABLES RAGS PART D TABLE 9 - NORTH WATERFRONT SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.	
	Reasonable Maximum Exposures
9.1.RME	Current Adolescent Trespassers - North Waterfront
9.2.RME	Current Adult Trespassers - North Waterfront
9.3.RME	Current Lifelong Trespassers - North Waterfront
9.4.RME	Current Industrial Workers - North Waterfront
9.5.RME	Future Adolescent Trespassers - North Waterfront
9.6.RME	Future Adult Trespassers - North Waterfront
9.7.RME	Future Lifelong Trespassers - North Waterfront
9.8.RME	Future Industrial Workers - North Waterfront
9.9.RME	Current/Future Construction Workers - North Waterfront
9.10.RME	Hypothetical Child Residents - North Waterfront
9.11.RME	Hypothetical Adult Residents - North Waterfront
9.12.RME	Hypothetical Lifelong Residents - North Waterfront

#### TABLE 9.1.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcin	ogenic Hazard	Quotient	
	Wediam	, out	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	2E-08		5E-08	T	7E-08	NA NA				**
			Benzo(a)pyrene	1E-07		4E-07	- 1	5E-07	NA NA				
			Benzo(b)fluoranthene	2E-08		6E-08		8E-08	NA			;	
			Chrysene	2E-10		6E-10		8E-10	NA				
			Dibenzo(a,h)anthracene	1E-07		3E-07		4E-07	NA NA				
			Indeno(1,2,3-cd)pyrene	8E-09		2E-08		3E-08	NA NA				
	l	}	Chromium VI	6E-07				6E-07	None Specified	0.0009			0.0009
	Į.	1	Cobalt						Thyroid	0.006			0.006
		1	Iron						GS	0.007			0.007
			Manganese						CNS	0.003		~-	0.003
			Chemical Total	9E-07		8E-07		2E-06	]	0.02			0.02
		Exposure Point Total		i				2E-06					0.02
	Exposure N	Medium Total		ji i				2E-06					0.02
	Air	North Waterfront	Benzo(a)anthracene		2E-14			2E-14	NA NA				
			Benzo(a)pyrene	I	2E-13			2E-13	NA NA		l		
			Benzo(b)fluoranthene		2E-14			2E-14	NA NA		l [		
	l		Chrysene		2E-15		ļ	2E-15	NA NA		l 1		
•	ì		Dibenzo(a,h)anthracene	I	1E-13			1E-13	NA NA				
			Indeno(1,2,3-cd)pyrene		9E-15		1	9E-15	NA NA				
		1	Chromium VI		8E-10		l i	8E-10	Respiratory		0.0000002		0.0000002
	1	1	Cobalt		2E-11			2E-11	Respiratory		0.000002		0.000002
		1	Iron						NA NA			'	
	ľ		Manganese						CNS		0.000009		0.000009
	1	·	Chemical Total		8E-10			8E-10			0.00001		0.00001
	1	Exposure Point Total		1				8E-10				Ü	0.00001
	Exposure	Medium Total						8E-10					0.00001
								2E-06	10.				0.02
Medium Total				II.				21-00					0.02

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.2.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	9E-09		5E-09	T I	1E-08	NA NA				
	1		Benzo(a)pyrene	6E-08		3E-08		1E-07	NA NA				
			Benzo(b)fluoranthene	1E-08		5E-09	l l	2E-08	NA NA				
		1	Chrysene	9E-11		5E-11		1E-10	NA NA				
	<u> </u>		Dibenzo(a,h)anthracene	5E-08		3E-08		7E-08	NA NA				
	ł	1	Indeno(1,2,3-cd)pyrene	4E-09	1	2E-09		6E-09	NA NA				
		1	Chromium VI	3E-07			1 1	3E-07	None Specified	0.0007			0.0007
	1		Cobalt						Thyroid	0.004			0.004
			Iron				-		GS	0.005			0.005
	i		Manganese	<u> </u>					CNS	0.002			0.002
			Chemical Total	4E-07		7E-08		5E-07		0.01			0.01
	L	Exposure Point Total						5E-07					0.01
	Exposure	Medium Total						5E-07					0.01
	Air	North Waterfront	Benzo(a)anthracene		1E-14			1E-14	NA NA	v-			
			Benzo(a)pyrene		1E-13			1E-13	NA NA				
		1	Benzo(b)fluoranthene		2E-14			2E-14	NA NA				
	1		Chrysene		1E-15		1 [	1E-15	NA NA				
		1	Dibenzo(a,h)anthracene	I	8E-14			8E-14	NA NA				
	i		Indeno(1,2,3-cd)pyrene		6E-15			6E-15	NA NA				
	i		Chromium VI		5E-10		-	5E-10	Respiratory		0.0000002		0.0000002
			Cobalt	i	4E-11			4E-11	Respiratory		0.000002		0.000002
			Iron						NA NA		<b>!</b>		
		1	Manganese	<u> </u>					CNS		0.000009		0.000009
			Chemical Total		6E-10		: "	6E-10	<u> </u>		0.00001		0.00001
	L	Exposure Point Total					_	6E-10	L				0.00001
	Exposure	Medium Total		(				6E-10					0.00001
Medium Total		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		1				5E-07					0.01
Receptor Total				,			otor Risk Total	5E-07	<del></del>		Dag	eptor HI Total	0.01

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.3.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	ogenic Hazard	Quotient	
		1	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	3E-08		6E-08		9E-08		1			
		1	Benzo(a)pyrene	2E-07	1	4E-07		6E-07					1
		1	Benzo(b)fluoranthene	3E-08		7E-08	l i	1E-07	1				(
	i	1	Chrysene	3E-10		6E-10		9E-10					
	1	1	Dibenzo(a,h)anthracene	2E-07		3E-07	i I	5E-07			1		
			Indeno(1,2,3-cd)pyrene	1E-08		3E-08	l I	4E-08			1		
		1	Chromium VI	9E-07				9E-07			1		
			Cobalt						1		i		
		1	Iron				l			Ì	l l	ŀ	i
		1	Manganese				l 1		<u> </u>				
		1	Chemical Total	1E-06		9E-07		2E-06	]				
		Exposure Point Total	•					2E-06	1				
	Exposure	Medium Total						2È-06					
	Air	North Waterfront	(Benzo(a)anthracene		4E-14			4E-14	Y		,		T
			Benzo(a)pyrene		3E-13		l i	3E-13	i	!	Į I	i	
		1	Benzo(b)fluoranthene		4E-14		[	4E-14		1	{		
			Chrysene		4E-15			4E-15		1	{		(
			Dibenzo(a,h)anthracene		2E-13		l [	2E-13		1	<b>i</b>		{
			Indeno(1,2,3-cd)pyrene		2E-14		l i	2E-14		1			i
			Chromium VI		1E-09		l [	1E-09	l	1	<b>{</b>		
	1	1	Cobalt		5E-11		[	5E-11	N	1	(	I	l
		1	Iron	J					l	1	(	l	1
		1	Manganese						ii .	l	(		
	1	1	Chemical Total	† · · · · · · · · · · · · · · · · · · ·	1E-09		i i	1E-09	il				
		Exposure Point Total	Torrament Call	╬	00			1E-09	il				<del></del>
	Evnosura	Medium Total	****	<del>1</del>				1E-09	1	·			
Medium Total	Exposure	viculum Total		╁───				2E-06					
Receptor Total	*			<u> </u>			tor Risk Total	2E-06	<u> </u>				

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.4.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcin	ogenic Hazard (	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Tota
urface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	6E-08		5E-08	1	1E-07	NA				
	1		Benzo(a)pyrene	4E-07		4E-07		8E-07	NA NA				
	1		Benzo(b)fluoranthene	7E-08		6E-08		1E-07	NA				
	1		Chrysene	6E-10		5E-10		1E-09	NA NA				
		1	Dibenzo(a,h)anthracene	3E-07		3E-07		6E-07	NA				
			Indeno(1,2,3-cd)pyrene	3E-08		2E-08	I I	5E-08	NA				
		1	Chromium VI	2E-06			I I	2E-06	None Specified	0.004			0.004
		i	Cobalt						Thyroid	0.02			0.02
		l .	Iron						GS	0.03			0.03
	•	į.	Manganese						CNS	0.009			0.009
			Chemical Total	3E-06		8E-07		4E-06	]	0.06			0.06
		Exposure Point Total	· · · · · · · · · · · · · · · · · · ·					4E-06	1				0.06
	Exposure	Medium Total						4E-06					0.06
	Air	North Waterfront	Benzo(a)anthracene		2E-13	**		2E-13	NA				
	ľ		Benzo(a)pyrene		1E-12			1E-12	NA NA				
	ľ	1	Benzo(b)fluoranthene		2E-13			2E-13	NA			'	
			Chrysene	l	2E-14			2E-14	NA NA				
			Dibenzo(a,h)anthracene		1E-12			1E-12	NA				
			Indeno(1,2,3-cd)pyrene		8E-14			8E-14	NA				
			Chromium VI		7E-09			7E-09	Respiratory		0.000002		0.00000
			Cobalt	l	5E-10			5E-10	Respiratory		0.00002		0.00002
	1	1	Iron						NA				
			Manganese				l l		CNS		0.00010		0.00010
			Chemical Total		7E-09		1 1	7E-09	li		0.0001		0.0001
	<u>l</u>	Exposure Point Total						7E-09					0.0001
	Exposure	Medium Total						7E-09					0.0001
dium Total				J				4E-06					0.06
ceptor Total							otor Risk Total	4E-06				eptor HI Total	0.06

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

PAGE 1 OF 1

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	nogenic Hazard	Quotient	
	Wediant		Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	2E-08		5E-08		7E-08	NA	-			
		ì	Benzo(a)pyrene	1E-07		4E-07		5E-07	NA NA				
	ł	i	Benzo(b)fluoranthene	2E-08		6E-08	1	8E-08	NA NA				
	l .	ĺ	Chrysene	2E-10		5E-10		7E-10	NA NA				
	l		Dibenzo(a,h)anthracene	1E-07	1	3E-07		4Ë-07	NA NA				
			Indeno(1,2,3-cd)pyrene	9E-09		3E-08		3E-08	NA NA				
	1		Chromium VI	8E-07				8E-07	None Specified	0.001			0.001
	•		Cobalt						Thyroid	0.007	}		0.007
		!	iron				]		GS	0.007		-	0.007
		i	Chemical Total	1E-06		8E-07		2E-06	1	0.01			0.01
		Exposure Point Total		<u>יו</u>				2E-06					0.01
	Exposu	re Medium Total	·					2E-06					0.01
	Air	I North Waterfront	Benzo(a)anthracene		2E-14			2E-14	NA NA				
	[ · · ·		Benzo(a)pyrene		2E-13			2E-13	NA NA				
	1	1	Benzo(b)fluoranthene	II	2E-14			2E-14	NA NA		1		ł
			Chrysene		2E-15			2E-15	NA NA		!		
	i		Dibenzo(a,h)anthracene		1E-13			1E-13	NA NA				
	1	Į.	Indeno(1,2,3-cd)pyrene		1E-14			1E-14	NA NA				
		1	Chromium VI		1E-09			1E-09	Respiratory		0.0000003		0.0000003
		1	Cobalt		2E-11			2E-11	Respiratory		0.000003		0.000003
		1	Iron		1		1		NA				
			Chemical Total	<b>-</b>	1E-09			1E-09	]		0.000003		0.000003
		Exposure Point Total		7	·			1E-09					0.000003
	Exposu	re Medium Total	<del></del>	-i				1E-09					0.000003
Medium Total		TO MIDGIGHT FORCE						2E-06					0.01
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	4E-08		1E-07		1E-07	NA		-		
Subsurface Suii	Sabsariace Con	Holat Walcinon	Dibenzo(a,h)anthracene	2E-08		5E-08		7E-08	NA		1		
			Aluminum						CNS	0.002			0.002
	l l		Chromium VI	6E-07				6E-07	None Specified	0.0010			0.0010
	į.	l l	Cobalt				i I		Thyroid	0.008			0.008
			Iron						ĠS	0.008			0.008
ı			Chemical Total	7E-07		2E-07		8E-07	1	0.02			0.02
	i i	Exposure Point Total			•		•	8E-07					0.02
	Exposit	re Medium Total						8Ē-07					0.02
	I Air	North Waterfront	Benzo(a)pyrene	<del></del>	4E-14		T	4E-14	NA NA	T	i '		
	<u> </u> ^"	1401111 41 ALGITION	Dibenzo(a,h)anthracene		2E-14			2E-14	NA NA				
			Aluminum						CNS		0.000003		0.000003
			Chromium VI		8E-10			8E-10	Respiratory		0.0000002		0.0000002
			Cobalt	1	2E-11			2E-11	Respiratory		0.000003		0.000003
			Iron	l					NA NA				
			Chemical Total	┪—ःः	8E-10		- :-	8E-10	i ''''		0.000006		0.000006
1		Exposure Point Total	ACTION TOTAL	┪			•	8E-10	1		•		0.000006
	Evanou	re Medium Total		<del>                                     </del>				8E-10	<del> </del>		·	<del></del>	0.000006
	Exposu	ie Medinii i orai						8E-07	<del></del>				0.02
Medium Total				11				0E-U1	1				0.02

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenic	: Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	8E-09		4E-09		1E-08	NA NA				-
			Benzo(a)pyrene	6E-08		3E-08		1E-07	NA NA		[		í
			Benzo(b)fluoranthene	1E-08		5E-09	l [	1E-08	NA		[		
			Chrysene	8E-11		4E-11		1E-10	NA		-		-
	ŀ	i	Dibenzo(a,h)anthracene	5E-08		3E-08		7E-08	NA NA			**	
			Indeno(1,2,3-cd)pyrene	4E-09		2E-09		6E-09	NA		1		
	<u> </u>		Chromium VI	4E-07				4E-07	None Specified	0.0008			0.0008
	l		Cobalt						Thyroid	0.005			0.005
	i		Iron					7.5	GS	0.005			0.005
			Chemical Total	5E-07		7E-08		6E-07	]	0.01			0.01
		Exposure Point Total						6E-07	]				0.01
	Exposure	e Medium Total						6E-07					0.01
	Air	North Waterfront	IBenzo(a)anthracene		1E-14			1E-14	NA NA				-
	ļ		Benzo(a)pyrene		1E-13			1E-13	NA NA				
			Benzo(b)fluoranthene		2E-14			2E-14	NA NA				
			Chrysene		1E-15			1E-15	NA.				
			Dibenzo(a,h)anthracene		8F-14			8E-14	NA NA				
			Indeno(1,2,3-cd)pyrene		7E-15			7E-15	NA.	i			
			Chromium VI		6E-10			6E-10	Respiratory	**	0.0000003		0.0000003
	1		Cobalt		4E-11			4E-11	Respiratory		0.000003		0.000003
	<u> </u>		Iron						NA NA				
			Chemical Total	➡	7E-10			7E-10	1 ''''		0.000003		0.000003
	1	Francis Delet Tetal	Chemical Total	┿	7E-10			7E-10			0.000000		0.000003
		Exposure Point Total  Medium Total						7E-10	<del></del>				0.000003
Medium Total	Exposure	e Medium Totai		<del></del>				6E-07		-			0.01
	ISubsurface Soil	North Waterfront	IDaara/alaurana	2E-08		9E-09	<del></del>	3E-08	NA NA				
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	9E-09		5E-09	I	1E-08	l NA				
		ł	Dibenzo(a,h)anthracene	9E-09		5E-09	I I		CNS	0.001	"		0.001
		ļ	Aluminum	II .				3E-07	None Specified	0.0007	"		0.0007
			Chromium VI	3E-07				3E-07	Thyroid	0.005			0.005
		1	Cobalt						GS	0.005	:		0.005
		l	Iron			45.00	· · · · · · · · · · · · · · · · · · ·	3E-07	4 68	0.005			0.003
			Chemical Total	3E-07		1E-08			-	0.01			
		Exposure Point Total						3E-07					0.01
	Exposure	e Medium Total	·-					3E-07					0.01
	Air	North Waterfront	Benzo(a)pyrene		3E-14			3E-14	NA				-
		1	Dibenzo(a,h)anthracene		2E-14		!	2E-14	NA				
		1	Aluminum						CNS		0.000003		0.000003
		l	Chromium VI		5E-10			5E-10	Respiratory		0.0000002		0.0000002
	i		Cobalt		4E-11			4E-11	Respiratory		0.000003		0.000003
		ı	Iron						NA				
						1	11	6E-10	71		0.000000		0.000000
			Chemical Total		6E-10	l		0E-1U	11		0.000006		0.000006
		Exposure Point Total	Chemical Total	<del>-</del>	6E-10				<del> </del>		0.000006		0.000006
	Evenous	Exposure Point Total e Medium Total	Chemical Total		6E-10			6E-10 6E-10	1		0.000006	*-	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.7.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio					ogenic Hazard		
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	3E-08		5Ē-08		8E-08					1
		l	Benzo(a)pyrene	2E-07		4E-07		6E-07	1	-			
			Benzo(b)fluoranthene	3E-08	- :	6E-08		9E-08	1				
			Chrysene	3E-10		5E-10		8E-10	li .				
			Dibenzo(a,h)anthracene	2E-07		3E-07		5E-07		l .			
			Indeno(1,2,3-cd)pyrene	1E-08		3E-08	-	4E-08	li l				
			Chromium VI	1E-06				1E-06	i				1
			Cobalt							1			
		1	Iron						1				
	ŀ		Chemical Total	2E-06		9E-07		2E- <u>06</u>	<u> </u>		L		
		Exposure Point Total						2E-06	l				
	Exposur	re Medium Total						2E-06					
	Air	North Waterfront	Benzo(a)anthracene		3E-14			3E-14					
			Benzo(a)pyrene		3E-13			3E-13					
			Benzo(b)fluoranthene		4E-14			4E-14					
			Chrysene		3E-15		**	3E-15		i			
			Dibenzo(a,h)anthracene		2E-13			2E-13	Į .		1		
			Indeno(1,2,3-cd)pyrene		2E-14			2E-14					1
			Chromium VI		2E-09			2E-09			1		1
			Cobalt		6E-11			6E-11	Į.		Į .		
	ł		Iron						<u>][</u>		<u> </u>		
	ì		Chemical Total		2E-09			2E-09	<u> </u>				
	i	Exposure Point Total						2E-09	ł				
	Exposur	re Medium Total						2E-09					
Medium Total								2E-06	<u> </u>				
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	5E-08	-	1E-07		2E-07		1	į .		
			Dibenzo(a,h)anthracene	3E-08		6E-08		9E-08		i	l .		ì
		1	Aluminum										
			Chromium VI	9E-07				9E-07	1				
		i	Cobalt				'		l l				
			Iron						4		ļ		<del> </del>
	ŀ		Chemical Total	1E-06		2E-07		1E-06	<u> </u>	<u> </u>			
		Exposure Point Total						1E-06	<u> </u>				
	Exposu	re Medium Total						1E-06					
	Air	North Waterfront	Benzo(a)pyrene		7E-14			7E-14	1				
	i	1	Dibenzo(a,h)anthracene		4E-14			4E-14		l	l		l
		1	Aluminum						Ĭ.			l	1
		1	Chromium VI		1E-09			1E-09		I		l	
		1	Cobalt		7E-11			7E-11				ŀ	
		1	1ron		::				_			L	<del></del>
		1	Chemical Total		1E-09			1E-09					
		Exposure Point Total						1E-09					
	Evnosiii	re Medium Total		<del></del>				1E-09					
								1E-06					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcinogen	ic Hazard Quoti	ent	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	5E-08		5E-08		1E-07	NA				
			Benzo(a)pyrene	4E-07		4E-07		8E-07	NA		-		
ľ		1	Benzo(b)fluoranthene	6E-0B		5E-08		1E-07	NA				
l .			Chrysene	5E-10		5E-10	-	1E-09	NA NA				**
[			Dibenzo(a,h)anthracene	3E-07		3E-07		6E-07	NA				-
	ı		Indeno(1,2,3-cd)pyrene	3E-08		2E-08		5E-08	NA				-
	1		Chromium VI	2E-06			-	2E-06	None Specified	0.004			0.004
			Cobalt				i I		Thyroid	0.03			0.03
Į.			Iron				1 - I		GS	0.02			0.02
			Chemical Total	3E-06		7E-07		4E-06		0.05			0.05
		Exposure Point Total		₹			<u> </u>	4E-06			•		0.05
ŀ	Exposi	re Medium Total						4E-06					0.05
li	Air	I North Waterfront	Benzo(a)anthracene		2E-13	T		2E-13	NA NA		1		3.00
11	A"	Notifi Walemont	Benzo(a)pyrene		1E-12		1 1	1E-12	NA NA		1		
lt .		ł	Benzo(b)fluoranthene		2E-13		"	2E-13	NA NA				l
li .		· t	Chrysene		2E-13		1 <sup></sup> {	2E-13 2E-14	NA NA				
		<b>+</b>			1E-12		1 . 1	1E-12	NA NA			1	I
H			Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene	II .	9E-14		1 : 1	9E-14	NA NA				
II .			Chromium VI		8E-09			9E-14 8E-09	Respiratory		0.000003	1	0.000003
				j	5E-10		"	5E-10	Respiratory		0.00003	i :	0.00003
			Cobalt			1	1 1				0.00003	i :	0.00003
	1		Iron	<del>-</del>					NA			<del> </del>	0.00003
11			Chemical Total	_	9E-09			9E-09			0.00003	<u> </u>	
		Exposure Point Total						9E-09					0.00003
	Exposu	re Medium Total						9E-09					0.00003
Medium Total			-					4E-06					0.05
Subsurface Soil	ISubsurface Soil	North Waterfront	Benzo(a)pyrene	1E-07	-	1E-07	I - I	2E-07	NA		T		
			Dibenzo(a,h)anthracene	6E-08		5E-08	i	1E-07	NA				
			Aluminum						CNS	0.007			0.007
1			Chromium VI	2E-06			1 1	2E-06	None Specified	0.004			0.004
			Cobalt				1 - 1		Thyroid	0.03	1		0.03
			Iron						ĠS	0.03		1	0.03
ļļ			Chemical Total	2E-06		1E-07		2E-06		0.07			0.07
		Exposure Point Total	Chomical Fotal	╡	<u> </u>		•	2E-06			·		0.07
I	Expense	re Medium Total	· · · · · · · · · · · · · · · · · · ·	<del></del>				2E-06					0.07
1			ID/-	-	T 4F 10		_	4E-13	NA			<del></del>	0.01
	Air	North Waterfront	Benzo(a)pyrene		4E-13	1 -			NA NA		! -		
1	1		Dibenzo(a,h)anthracene	1	2E-13	-		2E-13	NA CNS	1	0.00000	-	0.00003
l	. ]		Aluminum	<u> </u>	75.00		-	75.00		-	0.00003		
11		1	Chromium VI	1	7E-09		1	7E-09	Respiratory	<u> </u>	0.000002		0.000002
ll .			Cobalt		6E-10			6E-10	Respiratory		0.00003		0.00003
B		l	Iron			<u> </u>			NA				
N .			Chemical Total	<b>_</b>	7E-09			7E-09			0.00006		0.00006
11		Exposure Point Total						7E-09					0.00006
	Exposi	re Medium Total						7E-09	1				0.00006
	E ADOUG							2E-06					0.07

#### TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

PAGE 2 OF 2

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenic	Risk	_	No	n-Carcinogeni	c Hazard Quoti	ent	
i		1	Concern	Ingestion	Inhalation	Dermal	External	Exposure	Primary	Ingestion	Inhalation	Dermal	Exposure
	l		l	L			(Radiation)	Routes Total	Target Organ(s)				Routes Total
Groundwater	Groundwater	North Waterfront	cis-1,2-Dichloroethene						Kidney	0.02		0.0002	0.02
li .		i	Trichloroethene	2E-06		3E-08		2E-06	Immune System, Developmental	0.2		0.004	0.2
			Vinyl Chloride	4E-06		2E-08		4E-06	Liver	0.005		0.00002	0.005
			Aluminum						CNS	0.003		0.000001	0.003
	1		Chromium VI	9E-07		3E-08		9E-07	None Specified	0.002		0.00006	0.002
<b>[</b>		1	Iron						) GS	800.0		0.000004	800.0
1		1	Manganese				1		CNS	0.02		0.0002	0.02
	Į.		Chemical Total	7E-06		8E-08		7E-06		0.3		0.004	0.3
		Exposure Point Total		1				7E-06					0.3
	Exposure M	fedium Total	· · · · · · · · · · · · · · · · · · ·					7E-06					0.3
Medium Total		•						7E-06					. 0,3
Receptor Total				Total Car	ncer Risks for S	urface Soil and	Groundwater	1Ē-05	Total Hazar	d Indices for S	urface Soil and	Groundwater	0.4
Receptor Total	•			Total Cancer Risks for Subsurface Soil and Groundwater				9E-06	Total Hazard In	dices for Subs	urface Soil and	Groundwater	0.4
Note:													

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult PAGE 1 OF 2

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	4E-09		1E-09		5E-09	NA NA				
		1	Benzo(a)pyrene	3E-08		1E-08		4E-08	NA NA				
			Benzo(b)fluoranthene	4E-09		2E-09		6E-09	NA NA		(		(
	ŀ		Chrysene	4E-11		1E-11		5E-11	NA			**	
			Dibenzo(a,h)anthracene	2E-08		8E-09		3E-08	NA				
			indeno(1,2,3-cd)pyrene	2E-09	1	7E-10		3E-09	NA NA				
			Chromium VI	2E-07				2E-07	None Specified	0.001			0.001
			Cobalt		-				Thyroid	0.004			0.004
			Iron						GS	0.04		**	0.04
1	1		Chemical Total	2E-07		2E-08		2E-07	]i	0.05			0.05
i	1	Exposure Point Total		Ĭ				2E-07					0.05
l	Exposure	Medium Total						2É-07					0.05
	Air	I North Waterfront	Benzo(a)anthracene		3E-11			3E-11	NA				
1	<b>1</b> ""	Holai Halemon	Benzo(a)pyrene	1	2E-10			2E-10	NA NA				
l		1	Benzo(b)fluoranthene	1	3E-11		{ <u> </u>	3E-11	NA NA				
ſ			Chrysene		3E-12			3E-12	NA NA				
Í			Dibenzo(a,h)anthracene	1	2E-10			2E-10	NA NA				i
1			Indeno(1,2,3-cd)pyrene		1E-11			1E-11	NA NA				
1	1		Chromium VI		1E-06		<u> </u>	1E-06	Respiratory		0.01		0.01
}			Cobalt		9E-08		·	9E-08	Respiratory		0.03		0.03
1	ľ				92-00		1	3L-00	NA NA		0.00		0.00
			Iron		1E-06		<del></del>	1E-06	'\^	<del></del>	0.04		0.04
1			Chemical Total		1E-06						0.04		0.04
		Exposure Point Total		<u> </u>				1E-06					
	Exposure	Medium Total						1E-06					0.04
Medium Total								2E-06					0.09
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	8E-09		3E-09		1E-08	NA NA				
[			Dibenzo(a,h)anthracene	4E-09		2E-09		6E-09	NA				
1			Aluminum				i I		CNS	0.01			0.01
	ŀ		Chromium VI	1E-07				1E-07	None Specified	0.0009			0.0009
1			Cobalt						Thyroid	0.005			0.005
i	- 1		Iron				i 1		GS	0.05			0.05
1	1		Chemical Total	1E-07		5E-09		1E-07	]	0.07			0.07
1	1	Exposure Point Total		1				1E-07	1				0.07
1	Evnoeura	Medium Total						1E-07	1				0.07
1	I Air	North Waterfront	Benzo(a)pyrene	<del>1</del>	6E-11			6E-11	NA NA	T			
l	[711	140mil 44atemont	Dibenzo(a,h)anthracene	I	3E-11			3E-11	l ÑÃ				
ĺ	I	i	Aluminum		3E-11		"	JE-11 	CNS		0.1		0.1
i	1		Chromium VI		1E-06		1	1E-06	Respiratory		0.009		0.009
i	1		Cobalt	1	9E-08			9E-08	Respiratory	<u> </u>	0.009		0.003
i	1			n .				9E-08	NA	1	0.04		0.04
I	l		Iron	╣——	45.00				4 '*^	1	0.2		0.2
	1		Chemical Total	<u> </u>	1E-06			1E-06	4	l <del></del>	0.2		
		Exposure Point Total		<u> </u>				1E-06					0.2
	Exposure	Exposure Point Total Medium Total						1E-06 1E-06					0.2

## TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	North Waterfront	cis-1,2-Dichloroethene				T		Kidney	0.00005		0.0003	0.0004
			Trichloroethene	2E-09		1E-08		2E-08	Liver, Kidney	0.006		0.04	0.05
	1		Vinyl Chloride	4E-09		1E-08		2E-08	Liver	0.001		0.004	0.005
	1		Aluminum					* *	CNS	0.00009		0.00005	0.0001
		1	Chromium VI	9E-10		4E-08		4E-08	None Specified	0.000006		0.0003	0.0003
		1	Iron						GS	0.0002		0.0001	0.0003
			Manganese	]			1 - 1		CNS	0.0006		0.008	0.008
		1	Chemical Total	7E-09		6E-08		7E-08		0.008		0.05	0.06
		Exposure Point Total	<del></del>	1			·	7E-08					0.06
	Exposure N	Medium Total		1				7E-08		•			0.06
	Air	North Waterfront	Icis-1.2-Dichloroethene				I I		NA ~				
			Trichloroethene		3E-09			3E-09	Liver, Kidney		0.00009		0.00009
	1	l	Vinyl Chloride		5E-10		l i	5E-10	Liver		0.0001		0.0001
			Aluminum						CNS				!
			Chromium VI						Respiratory				
			Iron		4				NA				
1			Manganese				I I		CNS				
			Chemical Total		3E-09			3E-09			0.0002		0.0002
		Exposure Point Total	·	]				3E-09					0.0002
l	Exposure Medium Total							3E-09					0.0002
Medium Total								7E-08					0.06
Receptor Total			<del></del>	Total Car	cer Risks for S	urface Soil and	d Groundwater	2E-06	Total Haza	rd Indices for S	urface Soil and	Groundwater	0.2
Receptor Total					Risks for Subs			1E-06	Total Hazard I	ndices for Subs	urface Soil and	Groundwater	0.3
Notes		* *											

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.10.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe; Hypothetical Receptor Population: Residents Receptor Age: Child PAGE 1 OF 2

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcinogenio	: Hazard Quotie	nt	
	, incaren	7 5111	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	9E-07		3E-07		1E-06	NA				
			Benzo(a)pyrene	7E-06		3E-06		9E-06	NA NA				-
		1	Benzo(b)fluoranthene	1E-06		4E-07		1E-06	NA NA				
)	}	l	Chrysene	9E-09		3E-09		1E-08	NA NA				
1	1	1	Dibenzo(a,h)anthracene	5E-06		2E-06		7E-06	NA NA				-
	i		Indeno(1,2,3-cd)pyrene	5E-07		2E-07		6E-07	NA				
(			Chromium VI	4E-05				4E-05	None Specified	0.06			0.06
			Cobalt				1 1		Thyroid	0.3			0.3
			Iron						ĠS	0.3			0.3
		l	Chemical Total	5E-05		5E-06	1	6E-05		0.7			0.7
l		Exposure Point Total	periorinear rotar			02.00		6E-05					0.7
	Eventure Event	re Medium Total						6E-05					0.7
ļ	Exposu		15 / 1		T 05 40			9E-13	NA NA	<u> </u>			0.7
	Air	North Waterfront	Benzo(a)anthracene		9E-13	I		9E-13 7E-12	NA NA	1			
		Į.	Benzo(a)pyrene	-	7E-12				NA NA				1 -
		1	Benzo(b)fluoranthene		1E-12			1E-12	NA NA				1 -
		l	Chrysene		9E-14			9E-14					-
		ĺ	Dibenzo(a,h)anthracene		6E-12			6E-12	NA NA				
1			Indeno(1,2,3-cd)pyrene		5E-13		1	5E-13	NA.				
(			Chromium VI		5E-08			5E-08	Respiratory		0.00001		0.00001
i			Cobalt		5E-10			5E-10	Respiratory		0.0001		0.0001
		ŀ	Iron						NA NA				
<b>!</b>			Chemical Total		5E-08			5E-08			0.0001		0.0001
!		Exposure Point Total						5E-08					0.0001
Į.	Exposu	re Medium Total						5E-08				-	0.0001
Medium Total	· · · · · · · · · · · · · · · · · · ·							6Ë-05					0.7
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	2E-06	T	7E-07		3E-06	NA .				
		1	Dibenzo(a,h)anthracene	1E-06		4E-07		1E-06	NA NA				
			Aluminum						CNS	0.10			0.10
			Chromium VI	3E-05				3E-05	None Specified	0.05			0.05
			Cobalt						Thyroid	0.4			0.4
		i	Iron						. és	0.4			0.4
			Chemical Total	4E-05		1E-06	1	4E-05		0.9			0.9
		Exposure Point Total	John Modification		•			4E-05			•	_	0.9
	Fyman	re Medium Total	***************************************	<del></del>				4E-05					0.9
	Air	North Waterfront	Benzo(a)pyrene	<del></del>	ZE-12	1	Ţ	2E-12	NA"				
II.	I'''	North Waterfort	Dibenzo(a,h)anthracene		1E-12	1		1E-12	l ÑÃ				1
1	1		Aluminum	II .	1E-12			16-12	CNS		0.0001		0.0001
					4E-08			4E-08	Respiratory		0.00010		0.00010
	1		Chromium VI	ii .		l .		4E-08 6E-10	Respiratory		0.00010		0.00010
	1	Į.	Cobalt		6E-10				NA nespiratory		1	l	0.0001
· ·		1	Iron		15.00		· ·		NA NA				
	1		Chemical Total		4E-08			4E-08	ļ		0.0003		0.0003
	<u> </u>	Exposure Point Total						4E-08					0.0003
	Exposu	re Medium Total				•		4E-08					0.0003
Medium Total								4E-05	r				0.9

#### TABLE 9.10.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	Risk		No	n-Carcinogenio	: Hazard Quotie	nt	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	North Waterfront	cis-1,2-Dichloroethene						Kidney	0.1		0.02	0.2
			Trichloroethene (Mutagenic)	3E-06		5E-07		4E-06	NA				
		Į.	Trichloroethene (Nonmutagenic)	2E-06		4E-07		3E-06	immune System, Developmental	2		0.3	2
		l .	Vinyl Chloride	8E-05		4E-06		8E-05	Liver	0.03		0.002	0.03
		l	Aluminum				l I		CNS	0.02		0.0001	0.02
			Chromium VI	7E-06		4E-06	·	1E-05	None Specified	0.01		0.006	0.02
			Iron				i I		GS	0.06		0.0004	0.06
			Manganese	**					CNS	0.1		0.02	0.2
		Į	Chemical Total	9E-05		9E-06		1E-04	]	2		0.3	2
		Exposure Point Total						1E-04					2
	Exposure	Medium Total		Ì				1E-04	·				2
	Air	North Waterfront	cis-1,2-Dichloroethene				1		NA NA				
		ļ	Trichloroethene (Mutagenic)	1	3E-06			3E-06	NA NA				
			Trichloroethene (Nonmutagenic)		2E-06			2E-06	Liver, Kidney		3		3
			Vinyl Chloride		3E-06		l I	3E-06	Liver		0.007		0.007
			Aluminum				! I		CNS				
l			Chromium VI				; I		Respiratory				
			Iron		1				NA NA				
			Manganese				<u> </u>		CNS				
ĺ			Chemical Total	]	8E-06			8E-06			3		3
		Exposure Point Total						8E-06					3
	Exposure Medium Total							8E-06					3
Medium Total								1E-04					5
Receptor Total				Total Car	ncer Risks for S	urface Soil and	Groundwater	2E-04	Total Haza	rd Indices for S	urface Soil and	Groundwater	6
Receptor Total				Total Cancer	Risks for Subs	urface Soil and	Groundwater	1E-04	Total Hazard I	ndices for Subs	urface Soil and	Groundwater	6

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

a (2000).		
Target Organi	s - Surface Soil and (	Groundwater
Total CNS HI	0.2	
Total Developmental HI	2	
Total GS HI	0.4	
Total Kidney HI	3	
Total Liver HI	3	
Total Respiratory HI	0.0001	
Total None Specified HI	0.07	
Total Thyroid HI	0.3	

Target Organs - Suburface Soil and Groundwater Total CNS HI 0.3 Total Developmental HI Total GS HI 0.4 Total Kidney HI 3 Total Liver HI 3 Total Respiratory HI 0.0001 Total None Specified HI 0.06 Total Thyroid HI 0.4

## TABLE 9.11.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	1E-07	-	7E-08		2E-07	NA ·				
ł!			Benzo(a)pyrene	1E-06		5E-07	l [	2E-06	NA NA				
1		i	Benzo(b)fluoranthene	2E-07		8E-08		2E-07	NA NA				
			Chrysene	1E-09		7E-10		2E-09	NA				1
1		}	Dibenzo(a,h)anthracene	8E-07		4E-07		1E-06	NA NA				{
j		1	Indeno(1,2,3-cd)pyrene	7E-08		4E-08		1E-07	NA NA				
i		ì	Chromium VI	6E-06				6E-06	None Specified	0.006			0.006
		<b>,</b>	Cobalt						Thyroid	0.04			0.04
		ŀ	Iron				I I		GS	0.03			0.03
	1	i	Chemical Total	8E-06		1E-06		9E-06	1	0.08			0.08
		Exposure Point Total		<b></b>				9E-06		•	•		0.08
	Fynosur	e Medium Total		<del></del>				9E-06					0.08
	Air	North Waterfront	[Benzo(a)anthracene	<del> </del>	1E-12		T	1E-12	NA NA				† <del></del>
		Honer Waternord	Benzo(a)pyrene		1E-11		1 1	1E-11	NA NA				l
1	ł	1	Benzo(b)fluoranthene	1	2E-12		l i	2E-12	NA NA				l
		1	Chrysene		1E-13		l i	1E-13	NA NA				l
		1	Dibenzo(a,h)anthracene	1	8E-12			8E-12	NA NA				l
1			Indeno(1,2,3-cd)pyrene	1	7E-13	-		7E-13	NA NA				l
	1		Chromium VI		6E-08			6E-08	Respiratory		0.00001		0.00001
	1		Cobalt	1	2E-09			2E-09	Respiratory		0.0001		0.0001
			Iron	I	20-09			21-09	NA NA		0.0001		0.0001
ŀ			Chemical Total	<del></del>	6E-08		<del>                                     </del>	6E-08	110	<del></del>	0.0001		0.0001
	ĺ	B 1 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Chemical rotal		0E-00		<del>- "</del>	6E-08	<b> </b>	1	0.0001		0.0001
		Exposure Point Total		<u> </u>									
	Exposur	e Medium Total						6E-08					0.0001
Medium Total				<u> </u>				9E-06			,		0.08
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	3E-07		1E-07		4E-07	NA				· -
	i		Dibenzo(a,h)anthracene	1E-07		8E-08		2E-07	NA	1			1
	i		Aluminum						CNS	0.01			0.01
	Į.	I	Chromium VI	5E-06			[	5E-06	None Specified	0.005			0.005
			Cobalt						Thyroid	0.04			0.04
			Iron						GS	0.04			0.04
ĺ			Chemical Total	5E-06		2E-07		5E-06		0.09			0.09
Į.		Exposure Point Total						5E-06					0.09
1	Exposur	e Medium Total						5E-06					0.09
II.	Air	North Waterfront	Benzo(a)pyrene		3E-12		1	3E-12	NA NA				
l)	1	1	Dibenzo(a,h)anthracene		2E-12			2E-12	NA NA				
1	1	1	Aluminum						CNS		0.0001		0.0001
	1	i	Chromium VI		5E-08			5E-08	Respiratory		0.000010		0.000010
	1	ı	Cobalt	l	2E-09			2E-09	Respiratory	1	0.0001		0.0001
	İ	1	Iron						NA NA	]			
		1	Chemical Total	╣—	5E-08		·	5E-08	i '''`		0.0003		0.0003
	1	Exposure Point Total	noncinical rotal	┥	JE-00	·	<del></del>	5E-08	<del> </del>	1	0.0000	L	0.0003
L				+	<del></del>				<del></del>				
	<u>I Exposur</u>	e Medium Total		<del></del>				5E-08	ļ				0.0003
Medium Total				II .				5E-06	II				0.09

#### TABLE 9.11.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
roundwater	Groundwater	North Waterfront	cis-1,2-Dichloroethene						Kidney	0.06		0.007	0.07
			Trichloroethene (Mutagenic)	2E-06		3E-07		2E-06	NA .				
			Trichloroethene (Nonmutagenic	4E-06		7E-07		5E-06	ne System, Developm	0.7		0.1	0.8
	1		Vinyl Chloride	1E-05		5E-07	l I	1E-05	Liver	0.01		0.0007	0.01
		1	Aluminum						CNS	0.009		0.00005	0.009
		1	Chromium VI	4E-06		2E-06		6E-06	None Specified	0.005	1	0.002	0.007
			Iron						GS	0.02		0.0001	0.02
			Manganese				i		CNS	0.06		0.008	0.07
			Chemical Total	2E-05	-	3E-06		2E-05	]	0.8	-	0.1	1.0
		Exposure Point Total						2E-05					1.0
	Exposure	e Medium Total						2E-05					1.0
	Air	North Waterfront	cis-1,2-Dichloroethene						NA NA				
			Trichloroethene (Mutagenic)		4E-06		1	4E-06	NA NA				
		{	Trichloroethene (Nonmutagenic		6E-06		- 1	6E-06	Liver, Kidney		3		3
	ŀ	1	Vinyl Chloride		1E-06			1E-06	Liver		0.007		0.007
		(	Aluminum				1		CNS				
			Chromium VI				!		Respiratory				
		l	Iron				1		NA NA				
			Manganese				1		CNS				
			Chemical Total		1E-05			1E-05			3		3
		Exposure Point Total						1E-05	]				3
	Exposure Medium Tota	al						1E-05					3
edium Total								3E-05					4
				Total Car	year Dieke for S	urface Soil and	Groundwater	4E-05	Total Hazar	d Indices for S	urface Soil and	Groundwater	4
eceptor Total					Risks for Subs			4E-05			urface Soil and		

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

iliogeris (2003).		
Target Organ	s - Surface Soil and	Groundwater
Total CNS HI	0.08	
Total Developmental HI	0.8	
Total GS HI	0.06	
Total Kidney HI	3	1
Total Liver HI	3	
Total Respiratory HI	0.0001	
Total None Specified HI	0.01	
Total Thyroid HI	0.04	

Soil and Grour	dwater
0.09	
0.8	
0.06	
3	
3	
0.0001	
0.01	ŀ
0.04	
	0.8 0.06 3 3 0.0001 0.01

## TABLE 9.12.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soll	North Waterfront	Benzo(a)anthracene	1E-06		4E-07		1E-06	[				
l			Benzo(a)pyrene	8E-06	*-	3E-06		1E-05	H		ļ		
			Benzo(b)fluoranthene	1E-06		5E-07		2E-06	li .		(		
		1	Chrysene	1E-08		4E-09		1E-08		1	(		
	ŀ		Dibenzo(a,h)anthracene	6E-06		2E-06		8E-06					i
	1	ľ	Indeno(1,2,3-cd)pyrene	5E-07		2E-07	*-	7E-07	1				
	1	!	Chromium VI	5E-05	**			5E-05					
	1		Cobalt				- !		1		1		
	Ì		Iron						<u> </u>				
<b>i</b> ł			Chemical Total	6E-05		6E-06		7E-05	]				L
	L	Exposure Point Total						7È-05	]				
	Exposure	Medium Total						7E-05					
#	Air	North Waterfront	Benzo(a)anthracene		2E-12			2E-12			i -		
1			Benzo(a)pyrene		2E-11			2E-11	1				
1			Benzo(b)fluoranthene		3E-12		1	3E-12	ł		l 1		(
il		l	Chrysene		2E-13		!	2E-13	1				
1		l	Dibenzo(a,h)anthracene		1E-11			1E-11	{				1
1	1	l .	Indeno(1,2,3-cd)pyrene		1E-12			1E-12	ľ				
1	l	}	Chromium VI		1E-07			1E-07	4				i
1	ł	ŀ	Cobalt	·II	3E-09			3E-09	1				
1		ļ	Iron	1					i	ł			
il			Chemical Total	<b>-</b>	1E-07		[	1E-07	i				
il		Exposure Point Total	To Hormout Votal	=				1E-07	i — — —				
1	Exposure	Medium Total	-	-	·			1E-07	<del></del>				
Medium Total	Exposure	Mediam retai						7E-05	<u> </u>		-		
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	2E-06		8E-07		3E-06		<del>''</del>			
Subsurface Soil	Subsulface Soil	Noin Waterion	Dibenzo(a,h)anthracene	1E-06		4E-07		2E-06		1			
1			Aluminum	12-00		46-07							
1		1	Chromium VI	4E-05				4E-05	1				
			Cobalt	46.03				42-05	i				
1		1	Iron						1		1		
1			Chemical Total	4E-05		1E-06	- 1	4E-05	1	<b>———</b>			
i	ł	E Selet Tetel	Chemical Total	4E-05		15-06		4E-05	1		l .		ļ <del></del>
il	<u> </u>	Exposure Point Total			· · · · · · · · · · · · · · · · · · ·								<u></u>
1		Medium Total						4E-05					<u> </u>
1	Air	North Waterfront	Benzo(a)pyrene		5E-12			5E-12					
1			Dibenzo(a,h)anthracene		3E-12			3E-12		1			
11			Aluminum						1				
1	1	1	Chromium VI		9E-08			9E-08	1				(
			Cobait		3E-09			3E-09	I				1
							1 1		II .	ſ	1		Į.
			Iron			••			21				
			Iron Chemical Total	<del></del>	9E-08			9E-08	j				
		Exposure Point Total		=									
	Exposure	Exposure Point Total  Medium Total		=				9E-08					

#### TABLE 9.12.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	North Waterfront	cis-1,2-Dichloroethene Trichloroethene (Mutagenic) Trichloroethene (Nonmutagenic) Vinyi Chloride Aluminum Chromium VI Iron Manganese	5E-06 7E-06 9E-05 - 1E-05		9E-07 1E-06 5E-06  6E-06		6E-06 8E-06 9E-05  2E-05					
		1	Chemical Total	1E-04	<del>                                     </del>	1E-05	<del> </del>	1E-04	1				<del></del>
	i	Exposure Point Total	Non-inda i ota	72.01	•	12.00	· •	1E-04					<del></del>
	Exposure	Medium Total						1E-04			•		i
	Air	North Waterfront	cis-1,2-Dichloroethene Trichloroethene (Mutagenic) Trichloroethene (Nonmutagenic) Vinyl Chloride Aluminum Chromium VI Iron Manganese Chemical Total		6E-06 8E-06 5E-06   2E-05	        	      	6E-06 8E-06 5E-06   2E-05					
		Exposure Point Total					[	2E-05					J
	Exposure Medium Total							2E-05					
Medium Total								1E-04					
Receptor Total							Groundwater	2E-04				•	
Receptor Total				Total Cancer	Risks for Subs	urface Soil and	Groundwater	2E-04				-	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



## LIST OF TABLES RAGS PART D TABLE 9 - CENTRAL SHIPYARD SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.	
	Reasonable Maximum Exposures
9.1.RME	Current Adolescent Trespassers - Central Shipyard
9.2.RME	Current Adult Trespassers - Central Shipyard
9.3.RME	Current Lifelong Trespassers - Central Shipyard
9.4.RME	Current Industrial Workers - Central Shipyard
9.5.RME	Future Adolescent Trespassers - Central Shipyard
9.6.RME	Future Adult Trespassers - Central Shipyard
9.7.RME	Future Lifelong Trespassers - Central Shipyard
9.8.RME	Future Industrial Workers - Central Shipyard
9.9.RME	Current/Future Construction Workers - North Waterfront
9.10.RME	Hypothetical Child Residents - Central Shipyard
9.11.RME	Hypothetical Adult Residents - Central Shipyard
9.12.RME	Hypothetical Lifelong Residents - Central Shipyard

#### TABLE 9.1.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Cecntral Shipyard	Arsenic	1E-06		9E-07		2E-06	Skin, CVS	0.02		0.01	0.04
			Chromium VI	9E-07			-	9E-07	None Specified	0.001			0.001
			Cobalt						Thyroid	0.01			0.01
			Iron						GS	0.01			0.01
			Manganese						CNS	0.005			0.005
			Chemical Total	2E-06		9E-07		3Ë-06	l .	0.05		0.01	0.07
		Exposure Point Total						3E-06					0.07
	Exposure	Medium Total						3E-06					0.07
	Air	Cecntral Shipyard	Arsenic		3E-11			3E-11	Skin, CVS		0.000003		0.000003
			Chromium VI	]	1E-09			1E-09	Respiratory		0.0000003		0.0000003
			Cobalt		4E-11			4E-11	Respiratory		0.000005		0.000005
			Iron						NA NA		} I		
			Manganese				l L		CNS		0.00002		0.00002
			Chemical Total		1E-09		[	1E-09	]		0.00003		0.00003
		Exposure Point Total					[	1E-09					0.00003
	Exposure	Medium Total						1E-09					0.00003
Medium Total	· · ·							3E-06					0.07
Receptor Total			·			Becet	otor Risk Total	3E-06			Rece	eptor HI Total	0.07

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.2.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age; Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	e Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Arsenic	2E-06		2E-07	1	2E-06	Skin, CVS	0.02		0.002	0.02
			Chromium VI	4E-07				4E-07	None Specified	0.0010	[		0.0010
			Cobalt				1 1		Thyroid	0.009	i I		0.009
1		1	1ron	II			[		GS	0.009			0.009
			Manganese				l L		CNS	0.004			0.004
			Chemical Total	2E-06		2E-07	1	3E-06		0.04		0.002	0.04
	1	Exposure Point Total						3E-06					0.04
	Exposure I	Medium Total						3E-06					0.04
	Air	Central Shipyard	Arsenic		6E-11			6E-11	Skin, CVS		0.000003		0.000003
	ŀ	Į.	Chromium VI		8E-10		- :	8E-10	Respiratory		0.0000003		0.0000003
			Cobalt		8E-11			8E-11	Respiratory		0.000005		0.000005
		E .	Iron			1			NA		l 1		
	l l	l l	Manganese				1		CNS		0.00002		0.00002
			Chemical Total		9E-10		1	9E-10	ľ		0.00003		0.00003
	1	Exposure Point Total						9E-10					0.00003
	Exposure N	Medium Total	•					9E-10					0.00003
Medium Total								3E-06					0.04
Receptor Total						Poco	ptor Risk Total	3E-06		,	Bacc	eptor HI Total	0.04

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.3.FME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Demal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Arsenic	3E-06		1E-06		4E-06					T
i			Chromium VI	1E-06				1E-06	ı	i	ł l	i	
ì			Cobalt									i	Į.
1		1	iron	]								i	-
1		1	Manganese				I I					L	
			Chemical Total	5E-06		1E-06	1	6E-06	l				
	L	Exposure Point Total				-		6E-06					
•	Exposure	Medium Total	•					6E-06			<del></del>		
•	Air	Central Shipyard	Arsenic		9E-11		1 1	9E-11		1			1
•	1		Chromium VI		2E-09		1 - 1	2E-09	İ	l		ı	
	ı		Cobalt		1E-10			1E-10				l .	
	i	1	Iron									l .	
	İ		Manganese				1 1	**	ŀ			L	<u>i                                      </u>
		1	Chemical Total		2E-09			2E-09	l				
		Exposure Point Total						2E-09					
	Exposure	Medium Total	· · · · · · · · · · · · · · · · · · ·	]				2E-09					
Medium Total								6E-06					1
Receptor Total						Rece	ptor Risk Total	6E-06					i

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.4.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcin	ogenic Hazard	Quotient	
	Mediani	7 5 11 1	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Arsenic	1E-05		3E-06		2E-05	Skin, CVS	0.08		0.02	0.10
	j		Chromium VI	3E-06				3E-06	None Specified	0.005			0.005
	]		Cobalt						Thyroid	0.05			0.05
			iron						GS	0.04			0.04
			Manganese				1		CNS	0.02			0.02
ł		1	Chemical Total	2E-05	**	3E-06		2E-05	]	0.2		0.02	0.2
	ļ	Exposure Point Total						2E-05					0.2
	Exposure	Medium Total						2E-05					0.2
	Air	Central Shipyard	Arsenic		8E-10			8E-10	Skin, CVS		0.00003		0.00003
	l		Chromium VI		1E-08		**	1E-08	Respiratory		0.000003		0.000003
	l		Cobalt		1E-09			1E-09	Respiratory		0.00005		0.00005
	i		Iron	l					NA NA				
1	i		Manganese	1			1		CNS		0.0002		0.0002
	1		Chemical Total		1E-08			1E-08	]		0.0003		0.0003
		Exposure Point Total						1E-08					0.0003
	Exposure	Medium Total						1E-08					0.0003
Medium Total								2E-05					0.2
Receptor Total	***************************************		······································			Bece	otor Risk Total	2E-05			Rec	eptor HI Total	0.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concem	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soll	Surface Soil	Central Shipyard	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fuoranthene Chrysene Arsenic Chromium VI Cobalt Iron Manganese	2E-08 1E-07 3E-08 2E-10 1E-06 1E-06		7E-08 3E-07 8E-08 7E-10 9E-07		1E-07 4E-07 1E-07 1E-09 2E-06 1E-06 	NA NA NA NA Skin, CVS None Specified Thyroid GS CNS	   0.02 0.002 0.01 0.01		   0.01  	0.03 0.002 0.01 0.005
			Chemical Total	2E-06		1E-06		4E-06		0.05	**	0.01	0.07
l .	Evnoture	Exposure Point Total  Medium Total	· ·	╬——				4E-06 4E-06					0.07
	Air	Central Shipyard  Central Shipyard	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Chrysene Arsenic Chromium VI Cobalt Iron Manganese Chemical Total		3E-14 1E-13 3E-14 3E-15 3E-11 1E-09 4E-11			3E-14 1E-13 3E-14 3E-15 3E-11 1E-09 4E-11 	NA NA NA NA Skin, CVS Respiratory Respiratory NA CNS		0.000003 0.000003 0.000005  0.00002 0.00003		0.00003 0.000003 0.000005 0.00002 0.00003
	Exposure N	Medium Total						1E-09					0.00003
Medium Total								4E-06				·	0.07

#### TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk			Non-Carcin	ogenic Hazard	Quotient	
	Wedigin	) Oill	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Tota
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	2E-08		7E-08	1	9E-08	NA	"			
	1	1	Benzo(a)pyrene	2E-07		5E-07	I [	6E-07	NA NA		-		
	]		Benzo(b)fluoranthene	2E-08		6E-08		8E-08	NA				
			Chrysene	2E-10	••	7E-10		9E-10	NA		(		
			Dibenzo(a,h)anthracene	4E-08		1E-07		1E-07	NA				
		1	Indeno(1,2,3-cd)pyrene	2E-08		5E-08		6E-08	NA NA				
		ł	Aluminum						CNS	0.003			0.003
	<b>,</b>	1	Arsenic	1E-06		7E-07	1	2E-06	Skin, CVS	0.02		0.01	0.03
	ľ		Chromium VI	7E-07			1 1	7E-07	None Specified	0.001			0.001
			Cobalt						Thyroid	0.01			0.01
	<b>!</b>		iron						GS	0.01			0.01
	<b>}</b>		Chemical Total	2E-06		1E-06	*	3E-06	]	0.04		0.01	0.05
		Exposure Point Total		1				3E-06					0.05
	Exposure	Medium Total						3E-06					0.05
	Air	Central Shipyard	Benzo(a)anthracene		3E-14		1	3E-14	NA NA				
			Benzo(a)pyrene		2E-13			2E-13	NA NA				
	İ	į.	Benzo(b)fluoranthene		2E-14		}	2E-14	NA NA				
		l	Chrysene		3E-15			3E-15	NA NA				
	L	1	Dibenzo(a,h)anthracene		5E-14		-	5E-14	NA NA				
	İ	ł	Indeno(1,2,3-cd)pyrene		2E-14			2E-14	NA.				
		İ	Aluminum				1		CNS		0.000004		0.000004
		i	Arsenic		2E-11		1	2E-11	Skin, CVS		0.000002		0.000002
		1	Chromium VI		1E-09			1E-09	Respiratory		0.0000003		0.0000003
		i	Cobalt		3E-11		1 - 1	3E-11	Respiratory		0.000004		0.000004
		1	Iron				1		NA NA				<u> </u>
			Chemical Total	]	1E-09			1E-09			0.00001		0.00001
		Exposure Point Total		T				1E-09	l				0.00001
	Exposure	Medium Total						1E-09					0.00001
edium Total								3E-06					0.05
												eptor HI Total	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
		<u> </u>	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soit	Central Shipyard	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Chrysene Arsenic Chromium VI Cobalt Iron Manganese Chemical Total	1E-08 5E-08 1E-08 1E-10 2E-06 5E-07 		6E-09 3E-08 7E-09 6E-11 2E-07   3E-07		2E-08 8E-08 2E-08 2E-10 2E-06 5E-07 	NA NA NA NA Skin, CVS None Specified Thyroid GS CNS	0.01 0.001 0.009 0.009 0.003		  0.002    	0.02 0.001 0.009 0.009 0.003
	İ	Exposure Point Total	torioriida rotar	1 22 00	·	32 07	<u>'                                    </u>	3E-06	· · · · · · · · · · · · · · · · · · ·	0.04		0.002	0.04
	Exposure	Medium Total						3E-06					0.04
	Air	Central Shipyard	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Chrysene Arsenic Chromium VI Cobalt Iron Manganese Chemical Total	        	2E-14 9E-14 2E-14 2E-15 6E-11 8E-10 7E-11			2E-14 9E-14 2E-14 2E-15 6E-11 8E-10 7E-11	NA NA NA NA Skin, CVS Respiratory Respiratory NA CNS		0.000003 0.000003 0.000005  0.00002 0.00003		0.000003 0.000003 0.000003 0.000005 0.00002
	F	Exposure Point Total  Medium Total		<b>↓</b>				1E-09 1E-09				<del></del>	0.00003
Medium Total	Exposure i	viedium Total						3E-06					0.00003

#### TABLE 9.6.AME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	1E-08		6E-09	- 1	2E-08	NA NA				
			Benzo(a)pyrene	8E-08		4E-08	1	1E-07	NA NA				
			Benzo(b)fluoranthene	1E-08		5E-09		1E-08	NA NA				
			Chrysene	1E-10		6E-11	-	2E-10	NA NA				
	1		Dibenzo(a,h)anthracene	2E-08		9E-09	-	3E-08	NA NA				
	1		Indeno(1,2,3-cd)pyrene	8E-09		4E-09	-	1E-08	NA				
	l		Aluminum						CNS	0.002			0.002
			Arsenic	1E-06		2E-07		2E-06	Skin, CVS	0.01		0.001	0.01
		1	Chromium VI	4E-07				4E-07	None Specified	0.0008			0.0008
		1	Cobalt			i		~ -	Thyroid	0.008			0.008
		1	Iron		**				GS	0.007			0.007
			Chemical Total	2E-06		2E-07		2E-06		0.03		0.001	0.03
		Exposure Point Total						2E-06					0.03
	Exposure	Medium Total						2E-06					0.03
	Air	Central Shipyard	Benzo(a)anthracene		2E-14			2E-14	NA				
			Benzo(a)pyrene		1E-13			1E-13	NA				
	]	1	Benzo(b)fluoranthene	**	2E-14			2E-14	NA				
	<u>l</u>		Chrysene		2E-15			2E-15	NA NA				
	i	1	Dibenzo(a,h)anthracene		3E-14			3E-14	NA				
		i	Indeno(1,2,3-cd)pyrene		1E-14			1E-14	NA				j
		1	Aluminum	I				**	CNS		0.000004		0.000004
			Arsenic	ļ	5E-11			5E-11	Skin, CVS		0.000002		0.000002
		1	Chromium VI	i	6E-10			6E-10	Respiratory		0.0000003		0.0000003
		1	Cobalt		6E-11			6E-11	Respiratory		0.000004		0.000004
		1	Iron	*-					NA NA				<del></del>
	1		Chemical Total		7E-10			7E-10			0.00001		0.00001
	L	Exposure Point Total						7E-10			-		0.00001
·	Exposure	Medium Total						7E-10					0.00001
Medium Total								2E-06					0.03
Receptor Total						Recei	ptor Risk Total	5E-06	T "		Bec	eptor HI Total	0.07

Notes:

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.7.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenic	Risk			Non-Carcir	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Chrysene Arsenic Chromium VI	4E-08 2E-07 4E-08 4E-10 3E-06 1E-06	   	8E-08 4E-07 9E-08 8E-10 1E-06	   	1E-07 5E-07 1E-07 1E-09 4E-06 1E-06					
			Cobalt Iron Manganese Chemical Total	   5E-06	  	2E-06	  	7E-06					
		Exposure Point Total			L			7E-06		·	<b>.</b>		
	Exposure N	/ledium Total						7E-06					]
	Air	Central Shipyard	Benzo(a))anthracene Benzo(a)pyrene Benzo(b)fluoranthene Chrysene Arsenic Chromium VI Cobalt Itron Manganese [Chemical Total		5E-14 2E-13 5E-14 5E-15 9E-11 2E-09 1E-10			5E-14 2E-13 5E-14 5E-15 9E-11 2E-09 1E-10					
1	<u></u>	Exposure Point Total						2E-09					
	Exposure N	Medium Total						2E-09					
Medium Total								7E-06					<u>                                     </u>

#### TABLE 9.7.FME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Demal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	3E-08		7E-08		1E-07			i		Ī
			Benzo(a)pyrene	2E-07		5E-07	l I	7E-07		(	l		(
			Benzo(b)fluoranthene	3E-08		6E-08		9E-08	ł	1	{		(
	l		Chrysene	3E-10		7E-10		1E-09		1			•
	i	į.	Dibenzo(a,h)anthracene	6E-08		1E-07		2E-07	Į.				
	ł		Indeno(1,2,3-cd)pyrene	2E-08		5E-08		8E-08					
	]		Aluminum						ĺ				
	1		Arsenic	3E-06		9E-07		3E-06	ŀ	ļ			
	ł		Chromium VI	1E-06			1	1E-06		i			
			Cobalt	i			-						
			Iron	<u> </u>									
			Chemical Total	4E-06		2E-06		6E-06			L		<u> </u>
		Exposure Point Total		]				6E-06					
	Exposure	Medium Total						6E-06					
	Air	Central Shipyard	Benzo(a)anthracene		4E-14			4E-14					
	1		Benzo(a)pyrene		3E-13			3E-13					
•	Į.		Benzo(b)fluoranthene		4E-14			4E-14	ľ				
	Į.		Chrysene		4E-15		1	4E-15					
		1	Dibenzo(a,h)anthracene		8E-14			8E-14					
		1	Indeno(1,2,3-cd)pyrene		3E-14		- 1	3E-14	<b> </b>				
•		(	Aluminum		• •								
		l	Arsenic	I	7E-11			7E-11					
• !		-	Chromium VI		2E-09			2E-09					
		1	Cobalt		9E-11			9E-11					
		i	Iron						1				<u></u>
			Chemical Total	]	2E-09			2E-09		L	l		L
	L	Exposure Point Total						2E-09					
	Exposure	Medium Total						2E-09					
Medium Total								6E-06					
Receptor Total						Recei	ptor Risk Total	1E-05					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenic	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene	8E-08		7E-08		1E-07	NA				
	1		Benzo(a)pyrene	4E-07		3E-07	!	7E-07	NA				
l	1		Benzo(b)fluoranthene	9E-08		7E-08		2E-07	NA				
1			Chrysene	8E-10		7E-10		1E-09	NA				
1			Arsenic	1E-05		2E-06		1E-05	Skin, CVS	0.08		0.02	0.09
l <u>l</u>			Chromium VI	3E-06			l I	3E-06	None Specified	0.0008			0.0008
		1	Cobalt						Thyroid	0.005			0.005
1		i	Iron						és és	0.05			0.05
1			Manganese						CNS	0.02			0.02
1			Chemical Total	2E-05		3E-06		2E-05	1	0.1		0.02	0.2
		Exposure Point Total		<del></del>			•	2E-05	1				0.2
	Exposure	Medium Total	<del></del>	<del> </del>				2E-05					0.2
	Air	Central Shipyard	Benzo(a)anthracene		2E-13			2E-13	NA		· ·	4-	
1		Certifal Shipyard	Benzo(a)pyrene		1E-12		[	1E-12	NA NA				
			Benzo(b)fluoranthene		3E-13			3E-13	NA NA				
		ľ	Chrysene	I	2E-14			2E-14	NA NA				
N.		i	Arsenic		8E-10			8E-10	Skin, CVS		0.00003		0.00003
J.		1	Chromium VI		1E-08			1E-08	Respiratory		0.000004		0.000004
		Í		I ::	1E-08			1E-09	Respiratory		0.000004		0.000004
1			Cobalt	II	1E-09			12-09	NA NA		0.00002		0.00002
<u>[</u>			Iron				l <u></u>		CNS	l .	0.0002		0.0002
			Manganese				-		UNS	<del>-</del>			
			Chemical Total		1E-08			1E-08	ļ	<del></del>	0.0002		0.0002
		Exposure Point Total						1E-08					0.0002
	Exposure	Medium Total						1E-08					0.0002
Medium Total	·			JL				2E-05					0.2
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	7E-08		6E-08		1E-07	NA				**
N		1	Benzo(a)pyrene	5E-07		4E-07		9E-07	NA				
			Benzo(b)fluoranthene	6E-08		5E-08		1E-07	NA				
1			Chrysene	7E-10		6E-10		1E-09	NA NA				
4			Dibenzo(a,h)anthracene	1E-07		1E-07		2E-07	NA NA				
I		1	Indeno(1,2,3-cd)pyrene	5E-08		4E-08		9E-08	NA NA				
II .		l .	Aluminum						CNS	0.010			0.010
4		l .	Arsenic	1E-05		2E-06		1E-05	Skin, CVS	0.06		0.01	0.07
1	1	1	Chromium VI	2E-06				2E-06	None Specified	0.0007			0.0007
1		1	Cobalt						Thyroid	0.004			0.004
1	1	1	Iron						GS	0.04			0.04
li	1		Chemical Total	1E-05		3E-06	1	2E-05	1	0.1		0.01	0.1
H		Exposure Point Total	Joneniicai Totai	<b>ऻ</b> ॒॑॑ऀ		JL-00		2E-05	<del> </del>	1	· · · · · · · · · · · · · · · · · · ·	0.01	0.1
	Exercise 1		<u> </u>	╬				2E-05	<del></del>		<del></del>		0.1
	JI Exposure	Medium Total		<u></u>				<u> </u>	<u> </u>				V. 1

#### TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	Central Shipyard	Benzo(a)anthracene		2E-13			2E-13	NA				
	l l		Benzo(a)pyrene		2E-12			2E-12	NA NA				
		į.	Benzo(b)fluoranthene		2E-13			2E-13	NA NA				
		1	Chrysene		2E-14		- 1	2E-14	NA NA				
	1	ı	Dibenzo(a,h)anthracene	i	4E-13		1 1	4E-13	NA NA		**		
	1		Indeno(1,2,3-cd)pyrene		2E-13			2E-13	NA NA				
	1		Aluminum						CNS		0.00004		0.00004
			Arsenic		6E-10			6E-10	Skin, CVS		0.00003		0.00003
			Chromium VI	l	8E-09		l [	8E-09	Respiratory		0.000003		0.000003
			Cobalt		8E-10			8E-10	Respiratory		0.00001		0.00001
			Iron		l		<u> </u>		NA NA				
	1		Chemical Total	7	1E-08			1E-08			0.00008	* -	0.00008
		Exposure Point Total		7	•		· 1	1E-08				•	0.00008
	Exposur	e Medium Total						1E-08					0.00008
Medium Total								2E-05					0.1
Groundwater	Groundwater	Central Shipyard	Aluminum						CNS	0.003		0.000001	0.003
		1	Arsenic	4E-04		2E-07		4E-04	Skin, CVS	3		0.001	3
			Cadmium			~ -	1 1		Kidney	0.03		0.0003	0.03
	1	Į.	Cobalt						Thyroid	0.08		0.00001	0.08
	ľ		Iron						GS	0.9		0.0004	0.9
		i i	Manganese				l I		CNS	4		0.04	4
		J	Chemical Total	4E-04		2E-07		4E-04	ŀ	7		0.04	7
		Exposure Point Total	-1 .	1	*			4E-04				-	7
	Exposur	e Medium Total						4E-04					7
Medium Total								4E-04					7
Receptor Total				Total Cance	r Risks for Surfa	ace Soil and S	ubsurface Soil	4E-04	Total Hazard	Indices for Surf	ace Soil and Su	ubsurface Soil	7
Receptor Total					sks for Subsurf			4E-04	Total Hazard Indi				

Notes	
MOLES	

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Oragn His - Su	rface Soil and Grou	ndwate
Total CNS HI	4	
Total CVS HI	3	
Total GS HI	1	
Total Respiratory HI	0.00002	
Total None Specified HI	0.001	
Total Skin HI	3	
Total Thyroid HI	0.09	

Target Oragn His - Subs	urface Soil and	d Groundwater
Total CNS HI	4	
Total CVS HI	3	
Total GS HI	1	
Total Respiratory HI	0.00002	
Total None Specified HI	0.001	
Total Skin HI	3	
Total Thyroid HI	80.0	

## TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Chrysene Arsenic	5E-09 2E-08 6E-09 5E-11 9E-07		2E-09 1E-08 2E-09 2E-11 8E-08	   	7E-09 3E-08 8E-09 7E-11 9E-07	NA NA NA NA Skin, CVS	    0.1		   0.01	   0.1
			Chromium VI Cobalt Iron Manganese Chemical Total	2E-07   1E-06	  	   9E-08		2E-07   1E-06	None Specified Thyroid GS CNS	0.001 0.008 0.08 0.03	   	   0.01	0.001 0.008 0.08 0.03
	-	Exposure Point Total	<del></del>					1E-06					0,3
1		Medium Total		<u></u>				1E-06					0.3
	Air	Central Shipyard	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Chrysene Arsenic Chromium VI Cobalt Iron Manganese Chemical Total		4E-11 2E-10 5E-11 4E-12 1E-07 2E-06 2E-07	       		4E-11 2E-10 5E-11 4E-12 1E-07 2E-06 2E-07	NA NA NA NA Skin, CVS Respiratory Respiratory NA CNS		0.1 0.01 0.06  0.7		0.1 0.01 0.06  0.7
1		Exposure Point Total		<b></b>				2E-06					0.9
Medium Total	Exposure N	Medium Total						2E-06 3E-06					0.9

#### TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Current/Future Receptor Population: Construction Workers

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcin	nogenic Hazard	Quotient	
	Wedam	, one	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Tota
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	5E-09		2E-09		7E-09	NA				
	1	.,	Benzo(a)pyrene	3E-08		1E-08		5E-08	NA NA				
	1		Benzo(b)fluoranthene	4E-09	<b>)</b>	2E-09	] ]	6E-09	NA NA				
	l l		Chrysene	5E-11		2E-11	1 1	7E-11	l na				
			Dibenzo(a,h)anthracene	8E-09		3E-09	l I	1E-08	NA NA				
			Indeno(1,2,3-cd)pyrene	4E-09		1E-09	}	5E-09	NA NA				l
			Aluminum	1,2 00			}		CNS	0.02			0.02
			Arsenic	7E-07		6E-08		7E-07	Skin, CVS	0.1	ا	0.009	0.1
		1	Chromium VI	2E-07		0100		2E-07	None Specified	0.001	1	0.000	0.001
		i	Cobalt	22-07				22.07	Thyroid	0.007			0.007
		1		1 ::	I	::			GS	0.067			0.007
		1	Iron	_	· · · · · · · · · · · · · · · · · · ·				43				
			Chemical Total	9E-07		8E-08		1E-06		0.2		0.009	0.2
		Exposure Point Total						1E-06					0.2
	Exposur	e Medium Total						1E-06					0.2
	Air	Central Shipyard	Benzo(a)anthracene	1	4E-11			4E-11	NA NA				
			Benzo(a)pyrene	-	3E-10			3E-10	NA				
			Benzo(b)fluoranthene		3E-11			3E-11	NA 				l
			Chrysene		4E-12			4E-12	NA				
			Dibenzo(a,h)anthracene		7E-11			7E-11	NA				
	i		Indeno(1,2,3-cd)pyrene		3E-11			3E-11	NA NA				
			Aluminum					* *	CNS		0.2		0.2
			Arsenic		1E-07			1E-07	Skin, CVS		0.1		0.1
	i		Chromium VI	ļ	1E-06			1E-06	Respiratory		0.01		0.01
	i		Cobalt		1E-07			1E-07	Respiratory		0.05		0.05
	1		Iron				1		NA NA				
			Chemical Total		2E-06			2E-06			0.3		0.3
	i	Exposure Point Total						2E-06	]				0.3
	Exposur	e Medium Total	-					2E-06				_	0.3
ledium Total								3E-06					0.5
iroundwater	Groundwater	Central Shipyard	Aluminum						CNS	0.00008		0.00004	0.0001
	1		Arsenic	4E-07		2E-07		7E-07	Skin, CVS	0.07		0.03	0.1
			Cadmium	4					Kidney	0.0008		0.01	0.009
		1	Cobalt						Thyroid	0.002		0.0004	0.003
		1	Iron						. ĠS	0.02		0.01	0.04
	1	1	Manganese						CNS	0.1		1 1	<u>1</u>
	l	1	Chemical Total	4E-07		2E-07	<u> </u>	7E-07		0.2		1	2
		Exposure Point Total	griotimosi vota:	7				7E-07	i				2
	Exposur	e Medium Total	<del></del>	<del></del>				7E-07					2
Medium Total				7			**	7E-07					2
eceptor Total				Total Cance	r Risks for Surf	ace Soil and S	ubsurface Soil	4E-06	Total Hazard	Indices for Surf	ace Soil and Su	ubsurface Soil	3
eceptor Total				Total Cancer Ri	sks for Subsurf.	ace Soil and S	ubsurface Soil	3E-06	Total Hazard Indi	ces for Ssuburf	ace Soil and Su	ubsurface Soil	2
oles:													

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Oragn His - Su<u>rface Soil and Groun</u>dwater

Total CNS HI 2

Total CVS HI 0.4 Total GS HI 0.1 Total Respiratory HI 0.08 Total None Specified HI 0.001 Total Skin HI 0.4 Total Thyroid HI 0.01

Target Oragn His - Subsurface Soil and Groundwater

Total CNS Hi 2 Total CVS HI 0.3 Total GS HI 0.1 Total Respiratory HI 0.06 Total None Specified HI 0.001 Total Skin HI 0.3 Total Thyroid HI 0.009

#### TABLE 9.10.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene	1E-06		5E-07	- 1	2E-06	NA NA		"		
	1		Benzo(a)pyrene	6E-06		2E-06		8E-06	NA NA				
1			Benzo(b)fluoranthene	1E-06		5E-07		2E-06	NA NA				
			Chrysene	1E-08		5E-09		2E-08	NA NA				
	1	}	Arsenic	4E-05		3E-06		4E-05	Skin, CVS	1		0.08	} 1
ł		1	Chromium VI	5E-05				5E-05	None Specified	0.07			0.07
ll .	1		Cobalt						Thyroid	0.6			0.6
			Iron	· -					GS	0.6			0.6
l .			Manganese						CNS	0.2			0.2
N .			Chemical Total	1E-04		6E-06		1E-04		3		0.08	3
l .		Exposure Point Total		3		·		1E-04	]				3
ll .	Exposure	Medium Total		1				1Ē-04		-			3
N.	Air	Central Shipyard	Benzo(a)anthracene		1E-12			1E-12	NA NA				
		1	Benzo(a)pyrene		6E-12			6E-12	NA NA				-
1	·	1	Benzo(b)fluoranthene		1E-12			1E-12	NA				
1	ľ	1	Chrysene		1E-13			1E-13	NA				
	ľ	1	Arsenic		8E-10			8E-10	Skin, CVS		0.0001		0.0001
	ı	1	Chromium VI		6E-08			6E-08	Respiratory		0.00002		0.00002
ij .		1	Cobalt		1E-09			1E-09	Respiratory		0.0002		0.0002
N		ŀ	Iron						NA NA				
li .		1	Manganese						CNS		0.0008		0.0008
		<b>}</b>	Chemical Total		6E-08			6E-08			0.001		0.001
1	1	Exposure Point Total						6E-08					_0.001
1	Exposure I	Medium Total		1				6E-08	l				0.001
Medium Total				1				1E-04					3

#### TABLE 9.10.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
	Mediani	Font	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	1E-06		4E-07		2E-06	NA				
		1	Benzo(a)pyrene	8E-06		3E-06		1E-05	NA				
1	l		Benzo(b)fluoranthene	1E-06		4E-07		1E-06	NA		1		
			Chrysene	1E-08		4E-09		2E-08	NA				
			Dibenzo(a,h)anthracene	2E-06		7E-07		3E-06	NA				
ľ			Indeno(1,2,3-cd)pyrene	9E-07		3E-07	[	1E-06	NA ONE				
			Aluminum	1					CNS	0.1		0.07	0.1 0.9
l.		i	Arsenic	3E-05		3E-06		3E-05	Skin, CVS	0.8			0.06
ŀ		ł	Chromium VI	4E-05				4E-05	None Specified	0.06			0.06
-			Cobalt		-		- 1		Thyroid GS	0.5 0.5			0.5
4			lron						GS GS	2		0.07	2
1			Chemical Total	8E-05		7E-06	·	9E-05		2		0.07	
		Exposure Point Total		<u> </u>				9E-05		<del> </del>			2
Į.	Exposure	e Medium Total						9E-05		,	<del>,                                    </del>		
	Air	Central Shipyard	Benzo(a)anthracene		1E-12			1E-12	NA				
1			Benzo(a)pyrene		9E-12			9E-12	NA				
1	1		Benzo(b)fluoranthene		1E-12		l - i	1E-12	NA NA				
1			Chrysene		1E-13			1E-13	NA NA				-
	1		Dibenzo(a,h)anthracene		2E-12		- 1	2E-12	NA NA				
ll .	1		Indeno(1,2,3-cd)pyrene		9E-13			9E-13	CNS		0.0002		0.0002
li .	1		Aluminum					6E-10	Skin, CVS		0.0002		0.0002
9	1		Arsenic		6E-10			4E-08	Respiratory		0.0001		0.00001
<b>I</b>			Chromium VI		4E-08			8E-10	Respiratory		0.0002		0.0002
1		l l	Cobalt		8E-10			8E-10	NA NA		0.0002		0.0002
		1	Iron Chemical Total	<del> </del>	5E-08		<del></del>	5E-08	INA.		0.0005	<u> </u>	0.0005
			Chemical Lotal	<del> </del>	5E-08	<del></del>		5E-08			0.0003		0.0005
		Exposure Point Total		<del> </del>				5E-08	· · · · · · · · · · · · · · · · · · ·				0.0005
	Exposure	e Medium Total		<del> </del>				9E-05					2
Medium Total				<u> </u>		<del></del>	,		CNS	0.02		T 0.0001	0.02
Groundwater	Groundwater	Central Shipyard	Aluminum	05.04		4E-06		6E-04	Skin, CVS	17	<u> </u>	0.0001	17
ll .		1	Arsenic	6E-04		4E-06		6E-04	Kidney	0.2		0.0	0.2
ll .		1	Cadmium	1 ::		l ::			Thyroid	5		0.01	5
ii .		l	Cobalt	1		1	"		GS	6		0.04	6
1	1	1	Iron Manganese	- ::			l l		CNS	24		4	28
R	1		Chemical Total	6E-04		4E-06	<del>                                     </del>	6E-04	1 00	52	<del></del>	4	57
ll .		Exposure Point Total	Chemical Lotal	02-04		72-00	<u> </u>	6E-04	<del></del>		· · · · · · · · · · · · · · · · · · ·		57
U				<del></del>				6E-04	<del></del>				57
	Exposur	e Medium Total		<del></del>			<del></del>	6E-04					57
Medium Total				Tabal Comm	- Dioke for Co-	ogo Coil ard C	ubsurface Soil	8E-04	Total Hozard	Indices for Sur	face Soil and So	rhsurface Soil	59
Receptor Total			<del></del>					7E-04	Total Hazard Ind				59
Receptor Total				Total Cancer R	sks for Subsun	ace Soil and S	nnenuace 2011	/ Ç-U4	Total mazaro ino	ices in Sanpui	iace out and of	abadilace SOII	33

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Oragn His - Surface Soil and Groundwater

Total CNS HI 28 Total CVS HI 18 Total GS HI 0.0002 Total Respiratory HI Total None Specified HI 0.1 Total Skin HI 18 Total Thyroid HI 6

Target Oragn His - Subsurface Soil and Groundwater

Total CNS HI 28 Total CVS HI 18 Total GS HI Total Respiratory HI 0.0002 Total None Specified HI 0.1 Total Skin HI 18 Total Thyroid HI 6

#### TABLE 9.11.FME SUMMARY OF RECEPTER INSKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
		1 5.114	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)lluoranthene Chrysene Arsenic Chromium VI Cobalt	2E-07 9E-07 2E-07 2E-09 2E-05 7E-06		1E-07 5E-07 1E-07 1E-09 2E-06		3E-07 1E-06 3E-07 3E-09 2E-05 7E-06	NA NA NA NA Skin, CVS None Specified Thyroid GS	   0.1 0.008 0.07 0.06		   0.01	   0.1 0.008 0.07 0.06
		Exposure Point Total	Manganese Chemical Total	3E-05		3E-06		3E-05 3E-05	CNS	0.02		0.01	0.02 0.3 0.3
	Exposure N	Medium Total						3E-05					0.3
	Air	Central Shipyard	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Chrysene Arsenic Chromium VI Cobalt Iron Manganese Chemical Total	      	2E-12 8E-12 2E-12 2E-13 3E-09 8E-08 4E-09			2E-12 8E-12 2E-12 2E-13 3E-09 8E-08 4E-09	NA NA NA Skin, CVS Respiratory Respiratory NA CNS		0.0001 0.0002 0.0002 0.0008		  0.0001 0.0002 0.0002  0.0008
		Exposure Point Total						9E-08		·			0.001
Medium Total	Exposure N	Medium Total						9Ë-08 3E-05					0.001

#### TABLE 9.11.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	2E-07		9E-08		3E-07	NA NA				
1			Benzo(a)pyrene	1E-06	***	6E-07		2E-06	NA				
1			Benzo(b)fluoranthene	2E-07		8E-08		2E-07	NA		l		
1			Chrysene	2E-09		9E-10		3E-09	NA				
1		}	Dibenzo(a,h)anthracene	3E-07		1E-07	-	4E-07	NA				
1	†	l	Indeno(1,2,3-cd)pyrene	1E-07		7E-08	- 1	2E-07	NA NA				
1			Aluminum				-		CNS	0.01			0.01
ı	1		Arsenic	1E-05	` I	2E-06	<b>!</b> ∣	1E-05	Skin, CVS	0.08		0.01	0.09
1			Chromium VI	6E-06				6E-06	None Specified	0.006			0.006
1			Cobalt				-		Thyroid	0.06			0.06
1			Iron	ļ				25.00	GS	0.05			0.05
1			Chemical Total	2E-05		3E-06		2E-05		0.2		0.01	0.2
1		Exposure Point Total						2E-05					0.2
(	Exposure M	ledium Total		<u> </u>				2E-05					0.2
	Air	Central Shipyard	Benzo(a)anthracene		2E-12		-	2E-12	NA NA				
.1	ł		Benzo(a)pyrene		1E-11			1E-11 1E-12	NA NA			==	
.1			Benzo(b)fluoranthene		1E-12 2E-13		-	2E-13	NA NA			Ξ.	-
1			Chrysene Dibenzo(a,h)anthracene		3E-13			3E-13	NA NA				
(			Indeno(1,2,3-cd)pyrene		1E-12		: 1	1E-12	NA NA				
1	,	ĺ	Aluminum		16-12		"	16-12	CNS		0.0002		0.0002
1			Arsenic		2E-09			2E-09	Skin, CVS		0.0002		0.0002
1			Chromium VI		6E-08		"	6E-08	Respiratory		0.00001		0.00001
1			Cobalt		3E-09			3E-09	Respiratory		0.0002		0.0002
1			Iron	1	32-05			JL-03	NA NA		0.0002		0.0002
1			Chemical Total	1	7E-08		<del>                                     </del>	7É-08	. 130		0.0005		0.0005
1		Exposure Point Total	ichemical i otal	<del> </del>	7L-00		<u> </u>	7E-08		L	0.0000	l	0.0005
1		ledium Total		<del></del>	•			7E-08					0.0005
Medium Total	L Exposure iv	iculum rotas		<del></del>				2E-05					0.2
Groundwater	IGroundwater	Central Shipyard	[Aluminum						CNS	0.009		0.00004	0.009
Circuituwater	Ciodilawatei	Connai Shipyaru	Arsenic	1E-03		6E-06	ł <u> </u>	1E-03	Skin, CVS	7		0.04	7
	1		Cadmium	12-03		0L-00	1 1	12-00	Kidney	0.08		0.01	0.09
			Cobalt						Thyroid	2		0.005	2
	1		Iron						GS	3		0.01	3
1	1		Manganese						CNS	10		1	12
1			Chemical Total	1E-03		6E-06	<del></del>	1E-03	i	22		1	24
4		Exposure Point Total		1			•	1E-03			•		24
		ledium Total		i				1E-03					24
Medium Total	IL CAPOSUIE IV	iyaaa i yaa	****	<del> </del>			<del></del> 1	1E-03					24
Receptor Total				Total Cance	r Risks for Surfa	ace Soil and S	ubsurface Soil	1E-03	Total Hazard	Indices for Sur	ace Soil and Su	ubsurface Soil	
					IOI Outil	and Containe O							

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Oragn His - Surface Soil and Groundwater

Total Skin HI

Total Thyroid HI

#### TABLE 9.12.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Chrysene Arsenic Chromium VI Cobalt Iron Manganese Chemical Total	1É-06 7E-06 2E-06 1E-08 6E-05 6E-05 		6E-07 3E-06 6E-07 6E-09 5E-06   9E-06		2E-06 9E-06 2E-06 2E-08 6E-05 6E-05					
ŀ		Exposure Point Total						1E-04					
1	Exposure	Medium Total						1E-04					
	Air	Central Shipyard	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Chrysene Arsenic Chromium VI Cobalt Iron Manganese Chemical Total	       	3E-12 1E-11 4E-12 3E-13 4E-09 1E-07 5E-09	         		3E-12 1E-11 4E-12 3E-13 4E-09 1E-07 5E-09					
	Exposure	Medium Total		<del> </del>				1E-07					
Medium Total		HICGIGITI TOTAL		Ĺ				1E-04					

#### TABLE 9.12.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future Receptor Population: Residents Receptor Age; Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk			Non-Carcir	ogenic Hazard	Quotient	
	Wediam		Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	1E-06		5E-07		2E-06			ļ		
			Benzo(a)pyrene	9E-06		4E-06	-	1E-05			ļ		
			Benzo(b)fluoranthene	1E-06		5E-07		2E-06	· ·		<b>,</b>		
			Chrysene	1E-08		5E-09		2E-08			i		ļ
		1	Dibenzo(a,h)anthracene	2E-06		9E-07		3E-06		1	i		<b>,</b>
		1	Indeno(1,2,3-cd)pyrene	1E-06		4E-07	-	1E-06					1
		į.	Aluminum	15.05					ļ.		1		1
		i	Arsenic	4E-05		4E-06	1	5E-05 4E-05		Į.			
			Chromium VI	4E-05	-							ŀ	
			Cobalt	- 11						1			
1			Iron Chamical Tatal	1E-04	<del>-</del>	15.05	<del> </del>	1E-04	1	$\vdash$		<del></del>	<del> </del>
	ſ	Exposure Point Total	Chemical Total	1E-U4		1E-05		1E-04 1E-04	<b></b>	1		l	<del> </del>
.1	<del></del>			<del></del>									
		re Medium Total		<del></del>	*** SP 13	,	_	1E-04		<del>,</del>			
	Air	Central Shipyard	Benzo(a)anthracene		3E-12		- 1	3E-12					
		1	Benzo(a)pyrene Benzo(b)fluoranthene		2E-11	i	- 1	2E-11 3E-12					
		i	Chrysene		3E-12 3E-13			3E-12 3E-13		i			
		1	Dibenzo(a,h)anthracene		5E-12			5E-12		1			
		ł	Indeno(1,2,3-cd)pyrene		2E-12			2E-12					
			Aluminum					21-12					
			Arsenic	1	3E-09			3E-09		İ			
	ì		Chromium VI	1	1E-07			1E-07					
			Cobalt		4E-09			4E-09					
1			Iron	l									
i			Chemical Total	<del> </del>	1E-07		1	1E-07	i				
ł	i	Exposure Point Total		┪	1			1E-07		<del></del>			
!	Exposur	re Medium Total	<del></del>	i i				1E-07					
Medium Total	Сироза	- Weddin Yoldi		<del></del>	•			1È-04		· · · · · · · · · · · · · · · · · · ·			
Groundwater	IGroundwater	Central Shipyard	Aluminum	<del></del>	1					1	ĭ		
Groundwater	Groundwater	o critical crispycale	Arsenic	2E-03		1E-05		2E-03		i		ļ	
	1	1	Cadmium									l	
		1	Cobalt								1	ľ	1
	1		Iron							1		1	
	[		Manganese						J				
	1		Chemical Total	2E-03		1E-05		2E-03					
	1	Exposure Point Total		7				2E-03					
	Exposur	re Medium Total						2E-03					
Medium Total								2E-03					
Receptor Total				Total Cance	er Risks for Surf	ace Soil and S	ubsurface Soil	2E-03					Ï
Receptor Total							ubsurface Soil		T				
Notes:		•							•				

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Former Building 234

#### LIST OF TABLES RAGS PART D TABLE 9 - FORMER BUILDING 234 SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS

#### Table No. Reasonable Maximum Exposures 9.1.RME Current Adolescent Trespassers - Former Building 234 Current Adult Trespassers - Former Building 234 9.2.RME Current Lifelong Trespassers - Former Building 234 9.3.RME Current Industrial Workers - Former Building 234 9.4.RME Future Adolescent Trespassers - Former Building 234 9.5.RME Future Adult Trespassers - Former Building 234 9.6.RME Future Lifelong Trespassers - Former Building 234 Future Industrial Workers - Former Building 234 9.7.RME 9.8.RME Current/Future Construction Workers - North Waterfront 9.9.RME Hypothetical Child Residents - Former Building 234 Hypothetical Adult Residents - Former Building 234 9.10.RME 9.11.RME Hypothetical Lifelong Residents - Former Building 234 9.12.RME

#### TABLE 9.1.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenic	: Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	3E-08		8E-08		1E-07	NA NA				
		}	Benzo(a)pyrene	2E-07		7E-07	-	9E-07	NA NA		]		
		1	Benzo(b)fluoranthene	4E-08		1E-07		2E-07	NA NA				
	l l	ì	Chrysene	3E-10		1E-09		1E-09	NA NA				+-
	1		Dibenzo(a,h)anthracene	5E-08		1E-07	]	2E-07	NA				
	1		Indeno(1,2,3-cd)pyrene	1E-08		4E-08	i I	6E-08	NA				
	1		Arsenic	1E-06		7E-07	] [	2E-06	Skin, CVS	0.02		0.01	0.03
			Beryllium			~ -			GS	0.0004			0.0004
			Cadmium						Kidney	0.007		0.003	0.010
		1	Chromium VI	5E-06				5E-06	None Specified	0.007			0.007
			Cobalt						Thyroid	0.02			0.02
			Iron						ĠS	0.01			0.01
			Lead						NA NA				
			Manganese	1					CNS	0.006			0.006
		1	Chemical Total	6E-06		2E-06		8E-06	j	0.07		0.01	0.08
		Exposure Point Total	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1				8E-06	i				0.08
	Exposure	Medium Total		1				8E-06					0.08
	Air	Former Building 234	[Benzo(a)anthracene		3E-14			3E-14	NA NA				
			Benzo(a)pyrene	II	3E-13			3E-13	NA NA		1		
			Benzo(b)fluoranthene	1	4E-14			4E-14	NA				
			Chrysene	I	4E-15			4E-15	NA NA				
			Dibenzo(a,h)anthracene	ll	6E-14			6E-14	NA NA		1		
			Indeno(1,2,3-cd)pyrene	II	2E-14			2E-14	NA.				
			Arsenic	·	2E-11			2E-11	Skin, CVS	**	0.000002		0.000002
			Bervllium		2E-12			2E-12	Respiratory		0.0000003		0.0000003
	1		Cadmium		7E-12			7E-12	Kidney, Respiratory		0.000001		0.000001
		1	Chromium VI		6E-09			6E-09	Respiratory		0.000002		0.000002
		1	Cobalt	-	5E-11			5E-11	Respiratory		0.000007		0.000007
			Iron	1					NA				
		1	Lead	1					l NA				
	Į.	1	Manganese						CNS		0.00002		0.00002
	Į.		Chemical Total	<del></del>	6E-09			6E-09	1 - 1		0.00003		0.00003
		Exposure Point Total	Molicinical Loral	1	1 52-05	·	-	6E-09	1		2.23000		0.00003
	Evnneuro	Medium Total	<del></del>					6E-09					0.00003
Medium Total		recolum Fotal		1				8E-06	i		<del>_</del>		0.08
VIÇQIUIII I ÇIQI							otor Risk Total	8E-06				eptor HI Total	0.08

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.2.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential	ł		Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	1E-08		7E-09		2E-08	NA NA				
	ı	1	Benzo(a)pyrene	1E-07		6E-08		2E-07	NA NA				
	1	l l	Benzo(b)fluoranthene	2E-08		1E-08	l i	3E-08	NA NA		i		(
		ľ	Chrysene	2E-10		8E-11	l i	2E-10	NA i		(		
	ł		Dibenzo(a,h)anthracene	2E-08		1E-08	- 1	4E-08	NA NA				
			Indeno(1,2,3-cd)pyrene	7E-09		4E-09		1E-08	NA NA				
	i		Arsenic	1E-06		2E-07	]	2E-06	Skin, CVS	0.01		0.001	0.01
			Beryllium	I			1 1		GS	0.0003			0.0003
			Cadmium	l					Kidney	0.005		0.0004	0.005
			Chromium VI	2E-06				2E-06	None Specified	0.005			0.005
			Cobalt	ll					Thyroid	0.01			0.01
	1		Iron	I					ĞS	0.009			0.009
	1		Lead	1					NA NA		**		
1			Manganese				]		CNS	0.004			0.004
I			Chemical Total	4E-06		3E-07		4E-06	]	0.05		0.002	0.05
		Exposure Point Total	<del> </del>	1				4E-06					0.05
	Exposure	Medium Total						4E-06					0.05
	Air	Former Building 234	Benzo(a)anthracene	T	2E-14			2E-14	NA NA			**	
	į.	1	Benzo(a)pyrene	I	2E-13			2E-13	NA NA				
		i	Benzo(b)fluoranthene	l	3E-14			3E-14	NA I				
İ		i	Chrysene	l	3E-15			3E-15	NA NA				
			Dibenzo(a,h)anthracene	1	4E-14			4E-14	NA NA	**	-		
			Indeno(1,2,3-cd)pyrene		1E-14			1E-14	NA NA				
	l		Arsenic		4E-11			4E-11	Skin, CVS		0.000002		0.000002
	]		Beryllium		4E-12			4E-12	Respiratory		0.0000003		0.0000003
	1		Cadmium		1E-11			1E-11	Kidney, Respiratory		0.000001		0.000001
	1		Chromium VI		4E-09			4E-09	Respiratory		0.000002		0.000002
	1		Cobalt		1E-10			1E-10	Respiratory		0.000007		0.000007
	1		Iron						NA				
	1		Lead						NA NA				
	1		Manganese						CNS		0.00002		0.00002
	1	1	Chemical Total	i	4E-09			4E-09			0.00003		0.00003
	1	Exposure Point Total		i				4E-09	i				0.00003
	Exposure	Medium Total					i	4E-09					0.00003
Medium Total								4E-06	· · · · · · · · · · · · · · · · · · ·				0.05
							otor Risk Total	4E-06	-			eptor HI Total	0.05

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.3.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe; Current Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	4E-08		8E-08	1	1E-07		l i			
			Benzo(a)pyrene	3E-07		7E-07		1E-06					
			Benzo(b)fluoranthene	6E-08		1E-07		2E-07					
			Chrysene	5E-10		1E-09		2E-09					
			Dibenzo(a,h)anthracene	8E-08		2E-07		2E-07	i i		)		
			Indeno(1,2,3-cd)pyrene	2E-08		5E-08	1	7E-08	N .	1	)		
	1		Arsenic	2E-06		8E-07		3E-06		1	1		1
			Beryllium								1		}
			Cadmium										}
			Chromium VI	7E-06				7E-06					}
	ı		Cobalt		v-								1
			Iron										1
			Lead										
			Manganese				}			1	l		İ
			Chemical Total	1E-05		2E-06	<del> </del>	1E-05	il		· · · · · · · · · · · · · · · · · · ·		
		Exposure Point Total	Onomical votal	1 12 13			<u>'                                    </u>	1E-05	<b></b>		<u> </u>		<del></del>
	Exposure	Medium Total						1E-05					
	Air	Former Building 234	[Benzo(a)anthracene		5E-14			5E-14					
	, 41	1 officer ballaring 204	Benzo(a)pyrene		5E-13		1 1	5E-13					
		1	Benzo(b)fluoranthene		7E-14			7E-14		!			
			Chrysene		6E-15			6E-15	ľ				
			Dibenzo(a,h)anthracene	I	1E-13			1E-13					
	•		Indeno(1,2,3-cd)pyrene	II .	3E-14		1	3E-14			'		
			Arsenic		7E-11			7E-11					
			Beryllium	II .	7E-11	-*	1	7E-12					
			Cadmium		7E-12 2E-11			7E-12 2E-11					
			Chromium VI		1E-08			1E-08					
				l									
			Cobalt	·	2E-10			2E-10					
			Iron				- [			1			ĺ
	I		Lead	<u> </u>						1		ŀ	1
			Manganese				<del></del>			<b></b>	ļ		
	1		Chemical Total		1E-08			1E-08					
		Exposure Point Total		<u> </u>				1E-08					
	Exposure	Medium Total						1E-08					
Medium Total								1E-05					
Receptor Total				····		D	otor Risk Total	1E-05					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.4.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
	in dad		Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	8E-08		7E-08		2E-07	NA NA				
	1	1	Benzo(a)pyrene	7E-07		6E-07		1E-06	NA I				
			Benzo(b)fluoranthene	1E-07		1E-07		2E-07	NA NA				
			Chrysene	1E-09		9E-10		2E-09	NA NA				
	<b>,</b>	1	Dibenzo(a,h)anthracene	2E-07		1E-07		3E-07	NA NA				
	1	i	Indeno(1,2,3-cd)pyrene	5E-08		4E-08		9E-08	NA				
			Arsenic	9E-06		2E-06	-	1E-05	Skin, CVS	0.06		0.01	0.07
			Beryllium						GS	0.002			0.002
	1		Cadmium					**	Kidney	0.03		0.003	0.03
	1	I	Chromium VI	1E-05			1	1E-05	None Specified	0.03			0.03
	1		Cobalt			÷-			Thyroid	0.07			0.07
	.		Iron						l és	0.04			0.04
	1		Lead						NA I				
i	1		Manganese						CNS	0.02			0.02
1	1		Chemical Total	3E-05		3E-06	<del>   </del>	3E-05	j .	0.2		0.01	0.3
	1	Exposure Point Total		1				3E-05					0.3
	Exposure	Medium Total	···					3E-05					0.3
	lÀir	Former Building 234	IBenzo(a)anthracene		3E-13			3E-13	NA I				
i			Benzo(a)pyrene	I	2E-12			2E-12	NA I				
	1		Benzo(b)fluoranthene		4E-13			4E-13	NA I				
	]		Chrysene		3E-14			3E-14	NA I				
	1		Dibenzo(a,h)anthracene		6E-13			6E-13	NA NA				
l	1		Indeno(1,2,3-cd)pyrene		1E-13			1E-13	NA .				
A	1		Arsenic		6E-10			6E-10	Skin, CVS		0.00002		0.00002
	1		Bervllium		6E-11			6E-11	Respiratory		0.000003		0.000003
ļ	1		Cadmium		2E-10			2E-10	Kidney, Respiratory		0.00001		0.00001
	1	I	Chromium VI		5E-08			5E-08	Respiratory		0.00002		0.00002
			Cobalt	1	1E-09		l	1E-09	Respiratory		0.00007		0.00007
l	1	1	Iron	1					NA NA				
ŀ		l .	Lead						NA NA				
	1			NI .	ı		l l		CNS		0.0002		0.0002
					1								
			Manganese		1		† i	5E-08	1		0.0002		0.0003
		Exposure Point Total			5E-08			5E-08 5E-08	1				0.0003
	Europiro	Exposure Point Total	Manganese		1			5E-08					0.0003
Mading Total	Exposure	Exposure Point Total Medium Total	Manganese		1			5E-08 5E-08		2-1			0.0003 0.0003 0.0003
Medium Total Receptor Total	Exposure		Manganese		1		otor Risk Total	5E-08 5E-08 3E-05			0.0003	eptor HI Total	0.0003

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	ogenic Hazard	Quotient	
		1 3.1.	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	2E-08		7E-08		1E-07	NA				
	1		Benzo(a)pyrene	2E-07	]	6E-07		9E-07	NA NA				
			Benzo(b)fluoranthene	4E-08	1	1E-07		1E-07	NA NA	**	1		
	1		Chrysene	3E-10		8E-10	}	1E-09	NA NA				
			Dibenzo(a,h)anthracene	5E-08		1E-07		2E-07	NA NA				
İ			Indeno(1,2,3-cd)pyrene	1E-08		4E-08		6E-08	NA NA				
			Arsenic	9E-07		6E-07		2E-06	Skin, CVS	0.01	**	0.009	0.02
	<b>,</b>	}	Beryllium		!				GS	0.0005			0.0005
	i	1	Cadmium						Kidney	0.007		0.003	0.010
	İ	i	Chromium VI	5E-06	]			5E-06	None Specified	0.008			0.008
		i	Cobalt		]		1		Thyroid	0.02			0.02
	Į.	í	Iron						GS	0.01		•-	0.01
		İ	Lead						NA				
	i		Manganese						CNS	0.005			0.005
	ĺ		Chemical Total	6E-06	"	2E-06		8E-06		0.06		0.01	0.07
		Exposure Point Total						8E-06					0.07
	Exposure	Medium Total						8E-06					0.07
	Air	Former Building 234	Benzo(a)anthracene		3E-14			3E-14	NA NA				
		1	Benzo(a)pyrene		3E-13			3E-13	NA NA				1
	<b>!</b>	l	Benzo(b)fluoranthene		4E-14			4E-14	NA				
			Chrysene		3E-15		- 1	3E-15	NA NA				
			Dibenzo(a,h)anthracene		6E-14		-	6E-14	NA				
	1		Indeno(1,2,3-cd)pyrene		2E-14			2E-14	NA				
			Arsenic		2E-11			2E-11	Skin, CVS		0.000002		0.000002
			Beryllium		2E-12	**		2E-12	Respiratory		0.0000003		0.0000003
	1		Cadmium		7E-12			7E-12	Kidney, Respiratory		0.000001		0.000001
	1		Chromium VI		7E-09			7E-09	Respiratory		0.000002		0.000002
	1		Cobalt		5E-11			5E-11	Respiratory		0.000006		0.000006
	1		Iron						NA NA			+-	
	1		Lead						NA				
	]		Manganese						CNS		0.00002		0.00002
			Chemical Total		7E-09			7E-09	<u></u>		0.00003		0.00003
		Exposure Point Total						7E-09					0.00003
	Exposure	Medium Total						7E-09					0.00003
Medium Total				<del></del>				8E-06	)r				0.07

#### TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	nogenic Hazard	Quotient	
		,	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	5E-08	-	1E-07	-	2E-07	NA				
		Ĭ	Aluminum						CNS	0.003	1		0.003
	1		Arsenic	1E-06	]	9E-07		2E-06	Skin, CVS	0.02		0.01	0.03
	i		Chromium VI	1E-06			l I	1E-06	None Specified	0.002			0.002
			Cobalt						Thyroid	0.01			0.01
			Iron						ĞS	0.01			0.01
			Manganese						CNS	0.007			0.007
	ļ		Chemical Total	3E-06		1E-06		4E-06		0.06		0.01	0.07
	l	Exposure Point Total	·					4E-06					0.07
	Exposure	Medium Total						4E-06					0.07
	Air	Former Building 234	Benzo(a)pyrene	T	5E-14			5E-14	NA				
	1		Aluminum						CNS		0.000005		0.000005
	Į.	1	Arsenic		3E-11			3E-11	Skin, CVS		0.000003	ļ	0.000003
			Chromium VI		2E-09			2E-09	Respiratory		0.0000005		0.0000005
	Į.	1	Cobalt		3E-11			3E-11	Respiratory		0.000004		0.000004
			Iron	1					NA				
	ľ		Manganese						CNS		0.00003	<u></u>	0.00003
			Chemical Total		2E-09			2E-09			0.00004		0.00004
		Exposure Point Total	•	)				2Ē-09			•		0.00004
	Exposure	Medium Total		7				2E-09		-			0.00004
Medium Total			<del></del>					4E-06					0.07

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	1E-08		6E-09	1	2E-08	NA NA				
1			Benzo(a)pyrene	1E-07		5E-08		2E-07	NA NA				
l)			Benzo(b)fluoranthene	2E-08		9E-09		3E-08	NA NA				
1	1		Chrysene	1E-10		7E-11		2E-10	NA NA				
II .			Dibenzo(a,h)anthracene	2E-08		1E-08		4E-08	NA NA		(		
1			Indeno(1,2,3-cd)pyrene	7E-09		4E-09		1E-08	NA I				
1			Arsenic	1E-06		2E-07		1E-06	Skin, CVS	0.01		0.001	0.01
1			Beryllium						GS	0.0003	1		0.0003
	ŀ	}	Cadmium						Kidney	0.005		0.0004	0.005
1		1	Chromium Vi	2E-06				2E-06	None Specified	0.006			0.006
		1	Cobalt					• •	Thyroid	0.01		**	0.01
N .			Iron		i				GS	0.008			0.008
i		ŀ	Lead						NA NA				
1		}	Manganese						CNS	0.004			0.004
1			Chemical Total	4E-06		2E-07		4E-06		0.04		0.002	0.05
1	<u> </u>	Exposure Point Total						4E-06					0.05
N	Exposure N	Medium Total						4E-06					0.05
H	Air	Former Building 234	Benzo(a)anthracene		2E-14			2E-14	NA				
i			Benzo(a)pyrene		2E-13			2E-13	NA				
1			Benzo(b)fluoranthene		3E-14			3E-14	NA				-
4			Chrysene	1	2E-15			2E-15	NA				
			Dibenzo(a,h)anthracene	i	4E-14			4E-14	NA				
1			Indeno(1,2,3-cd)pyrene		1E-14			1E-14	NA				
N			Arsenic		4E-11			4E-11	Skin, CVS		0.000002		0.000002
ll .			Beryllium		5E-12			5E-12	Respiratory		0.0000003		0.0000003
H			Cadmium	1	1E-11			1E-11	Kidney, Respiratory		0.000001		0.000001
			Chromium VI		4E-09			4E-09	Respiratory		0.000002		0.000002
1		i	Cobalt		9E-11			9E-11	Respiratory		0.000006		0.000006
1		1	Iron				- 1		NA		-		
1		1	Lead				]		NA				
1			Manganese	<u></u>					CNS		0.00002		0.00002
1			Chemical Total	]	5E-09			5E-09			0.00003		0.00003
1	1	Exposure Point Total						5E-09					0.00003
<b>4</b>	Exposure N	Medium Total						5E-09					0.00003
Medium Total								4E-06	I				0.05

#### TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	2E-08		1E-08		3E-08	NA				
	l'institution de la company	1	Aluminum						CNS	0.002			0.002
ı	ł		Arsenic	2E-06		2E-07	1	2E-06	Skin, CVS	0.01		0.002	0.02
			Chromium VI	7E-07				7E-07	None Specified	0.002			0.002
			Cobalt	1					Thyroid	0.008			0.008
	1		Iron						ĠS	0.008			0.008
			Manganese	* *					CNS	0.005			0.005
			Chemical Total	3E-06		2E-07		3E-06		0.04		0.002	0.04
		Exposure Point Total		7	•	·	·i	3E-06					0.04
	Exposure	Medium Total						3E-06					0.04
	Air	Former Building 234	Benzo(a)pyrene		3E-14		i	3E-14	NA NA				
		1	Aluminum						CNS		0.000005		0.000005
			Arsenic	II	6E-11			6E-11	Skin, CVS		0.000003		0.000003
			Chromium VI	1	1E-09			1E-09	Respiratory		0.0000005		0.0000005
			Cobalt	1	7E-11	+-		7E-11	Respiratory		0.000004		0.000004
			Iron					* *	NA .		{		**
	1		Manganese				l I		CNS		0.00003		0.00003
			Chemical Total		1E-09			1E-09			0.00004		0.00004
		Exposure Point Total		1				1E-09					0.00004
	Exposure	Medium Total		1				1È-09					0.00004
Medium Total								3E-06					0.04

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.7.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	4E-08		8E-08		1E-07					
	1		Benzo(a)pyrene	3E-07		7E-07		1E-06	li			ľ	
			Benzo(b)fluoranthene	5E-08	<b>-</b> -	1E-07		2E-07				l	
			Chrysene	4E-10		9E-10		1E-09			i	1	į
i			Dibenzo(a,h)anthracene	8E-08		2E-07		2E-07		1	ļ		l
			Indeno(1,2,3-cd)pyrene	2E-08		5E-08		7E-08	1	į.		i	ł
			Arsenic	2E-06		8E-07		3E-06	1			İ	1
l .		1	Beryllium						<b>I</b>				1
1			Cadmium										1
1		1	Chromium VI	8E-06				8E-06	l				1
i	j		Cobalt		-								1
	ı	İ	Iron										1
		1	Lead										1
l .	Į.		Manganese				]		]	l			<u></u>
	ŀ		Chemical Total	1E-05		2E-06	1	1É-05	]			1	
		Exposure Point Total		1		•		1E-05		•			
	Exposure N	/ledium Total						1E-05					
	Air	Former Building 234	Benzo(a)anthracene		5E-14			5E-14	1				T
		_	Benzo(a)pyrene		4E-13			4E-13	1				1
		1	Benzo(b)fluoranthene		7E-14			7E-14	1		1	1	1
1		i	Chrysene		6E-15			6E-15				1	i
1			Dibenzo(a,h)anthracene		1E-13			1E-13				ļ	1
1			Indeno(1,2,3-cd)pyrene		3E-14			3E-14				İ	1
i		i	Arsenic	<b>!</b>	6E-11			6E-11	1			l	1
i		· ·	Beryllium		7E-12			7E-12	4			ł	1
			Cadmium	1	2E-11	~-		2E-11					1
1		1	Chromium VI	1	1E-08			1E-08					1
		1	Cobalt		1E-10			1E-10				l	1
1			Iron						l	1		ľ	1
			Lead						II.			l	Į.
			Manganese						]				
i			Chemical Total		1E-08			1E-08	]				
1		Exposure Point Total		1				1E-08					
1	Exposure N	Medium Total		1				1E-08	i				
Medium Total				4				1E-05					·

#### TABLE 9.7.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult) PAGE 2 OF 2

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene Aluminum Arsenic Chromium VI Cobalt Iron Manganese Chemical Total	7E-08  3E-06 2E-06   5E-06		1E-07  1E-06    1E-06		2E-07  4E-06 2E-06    7E-06					
	Evnocuro	Exposure Point Total  Medium Total						7E-06 7E-06					<del> </del>
	Air	Former Building 234	Benzo(a)pyrene Aluminum Arsenic Chromium VI Coball Iron Manganese Chemical Total		9E-14  9E-11 3E-09 1E-10  3E-09	    		9E-14 					
	Exposure N	Medium Total						3E-09					
Medium Total				<u> </u>			B	7E-06					<u> </u>

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Receptor Population: Industrial Workers Receptor Age: Adult

PAGE 1 OF 2

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	Risk			Non-Carcir	nogenic Hazard	Quotient	
	Weddin		Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	8E-08		7E-08		1E-07	NA NA	**			
			Benzo(a)pyrene	7E-07		6E-07		1E-06	NA NA				
			Benzo(b)fluoranthene	1E-07		9E-08		2E-07	NA NA		i I		<del>-</del> -
			Chrysene	9E-10		8E-10		2E-09	NA .				i
			Dibenzo(a,h)anthracene	2E-07		1E-07		3E-07	NA NA				ł
		}	Indeno(1,2,3-cd)pyrene	5E-08		4E-08	l i	9E-08	NA				
		1	Arsenic	9E-06		2E-06	-	1E-05	Skin, CVS	0.05		0.01	0.06
		1	Beryllium						GS	0.002			0.002
			Cadmium				·		Kidney	0.03		0.003	0.03
			Chromium VI	2E-05				2E-05	None Specified	0.03			0.03
			Cobalt				1 1		Thyroid	0.06			0.06
	1	ı	Iron				]		ĞS	0.04			0.04
	l l	1	Lead				1		NA NA				
			Manganese				l		CNS	0.02			0.02
	i	i	Chemical Total	3E-05		3E-06	- 1	3E-05	1	0.2		0.01	0.2
	i	Exposure Point Total	Jonethica Fotal	┪┈┈		02.00		3E-05	<del> </del>	U.L		0.01	0.2
	Evpour	e Medium Total		╬				3E-05	<del> </del>				0.2
	I Air	Former Building 234	Benzo(a)anthracene		2E-13			2E-13	NA NA				<u> </u>
	l <sub>Vii</sub>	Former Building 234					"	2E-13	NA NA				
		1	Benzo(a)pyrene	ti	2E-12				NA NA				
		1	Benzo(b)fluoranthene	-	4E-13			4E-13					
		1	Chrysene	l	3E-14			3E-14	NA NA				
			Dibenzo(a,h)anthracene	-	6E-13			6E-13	NA 				
			Indeno(1,2,3-cd)pyrene	1	1E-13			1E-13	NA SUL SUS				
			Arsenic		5E-10		-	5E-10	Skin, CVS		0.00002		0.00002
			Beryllium	1	6E-11			6E-11	Respiratory	**	0.000004		0.000004
			Cadmium		2E-10			2E-10	Kidney, Respiratory		0.00001		0.00001
			Chromium VI		6E-08			6E-08	Respiratory		0.00002		0.00002
			Cobalt	-	1E-09			1E-09	Respiratory		0.00006		0.00006
			Iron						NA NA				
			Lead						NA NA				
			Manganese			**	]		CNS		0.0002		0.0002
			Chemical Total		6E-08			6E-08	]		0.0003		0.0003
		Exposure Point Total	-	7				6E-08	1				0.0003
	Exposur	e Medium Total						6E-08					0.0003
Medium Total		- Madain Ford		┪				3E-05					0.2
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	1E-07		1E-07		3E-07	NA NA				
Subsuriace Sui	Joursullace 3011	Former Bulloting 234	Aluminum			12-07		3L-07	CNS	0.01			0.01
	1	1	Arsenic	1E-05		2E-06		1E-05	Skin, CVS	0.08		0.02	0.09
	1	]	Chromium VI	4E-06		2E-06		4E-06	None Specified	0.08		0.02	0.008
		1	Cobalt	46-06				4E-06	Thyroid	0.008			0.008
		i		H	1		1						
		ŀ	Iron						GS	0.04		1	0.04
		1	Manganese						CNS	0.03			0.03
	1		Chemical Total	2E-05		3E-06		2E-05		0.2		0.02	0.2
		Exposure Point Total						2E-05					0.2
	Function	e Medium Total						2E-05					0.2

#### TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	Former Building 234	Benzo(a)pyrene		4E-13			4E-13	NA				
		1	Aluminum						CNS	**	0.00005		0.00005
•			Arsenic		7E-10			7E-10	Skin, CVS		0.00003		0.00003
			Chromium VI		2E-08			2E-08	Respiratory		0.000005	'	0.000005
			Cobalt		9E-10			9E-10	Respiratory		0.00005		0.00005
1			Iron				· -		NA NA				
			Manganese						CNS		0.0003		0.0003
Ì			Chemical Total	]	2E-08	-		2E-08	][		0.0004		0.0004
		Exposure Point Total						2E-08	1				0.0004
	Exposure N	Medium Total						2E-08					0.0004
Medium Total								2E-05					0.2
Groundwater	Groundwater	Former Building 234	cis-1,2-Dichloroethene						Kidney	0.06		0.0007	0.06
		_	Trichloroethene	6E-07		1E-08		6E-07	ne System, Developm	80.0		0.001	0.08
			Vinyl Chloride	7E-07		3E-09		7E-07	Liver	0.0009		0.000004	0.0009
			Aluminum						CNS	0.0005		0.0000002	0.0005
l	1		Arsenic	7E-06		3E-09		7E-06	Skin, CVS	0.04		0.00002	0.04
	1		Cobatt				-		Thyroid	0.06	-	0.00001	0.06
1	i		Iron				j		GS	0.006		0.000003	0.006
1			Manganese			* -	i		CNS	0.2		0.002	0.2
			Chemical Total	8E-06		2E-08		8E-06		0.5		0.004	0.5
		Exposure Point Total						8E-06	L				0.5
	Exposure N	Medium Total						8E-06					0.5
Medium Total	•							8E-06					0.5
Receptor Total				Total Ca	ncer Risk for S	urface Soil and	Groundwater	4E-05	Total Haza	ard Index for S	urface Soil and	Groundwater	0.7
Receptor Total					er Risk for Subs			3E-05			urface Soil and		0.7
Notes:	***												

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	nogenic Hazard	Quotient	
	Modiam		Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	5E-09		2E-09		7E-09	NA				
li .			Benzo(a)pyrene	5E-08		2E-08	l	7E-08	NA NA		(		
1			Benzo(b)fluoranthene	8E-09		3E-09		1E-08	NA NA		l		
ì			Chrysene	6E-11		2E-11		9E-11	NA				
11	:	1	Dibenzo(a,h)anthracene	1E-08		4E-09	1	2E-08	NA				
1	ı	1	Indeno(1,2,3-cd)pyrene	3E-09		1E-09		4E-09	NA				
<b> </b>			Arsenic	6E-07		5E-08		6E-07	Skin, CVS	0.09		0.008	0.1
1		l	Beryllium						GS	0.001			0.001
li			Cadmium						Kidney	0.04	i	0.003	0.05
li .	<u> </u>		Chromium VI	1E-06				1E-06	None Specified	0.008			0.008
	1		Cobalt						Thyroid	0.010			0.010
	1	1	Iron				1		ĞS	0.07			0.07
ll .	1	1	Lead						NA				
			Manganese						CNS	0.03			0.03
1			Chemical Total	2E-06		8E-08		2E-06	i	0.3		0.01	0.3
		Exposure Point Total	Tonormour Total		<u> </u>	02.00		2E-06	<del></del>				0.3
II.	E. e.e.	e Medium Total		<del> </del>				2E-06					0.3
			10 (1)		45.44	· · · · · · · · · · · · · · · · · · ·		4E-11	NA			<del> </del>	0.0
	Air	Former Building 234	Benzo(a)anthracene		4E-11				NA NA				
II.			Benzo(a)pyrene		4E-10			4E-10			-		
1			Benzo(b)fluoranthene		6E-11			6E-11	NA				
			Chrysene		5E-12			5E-12	NA				
Į.	1		Dibenzo(a,h)anthracene		9E-11			9E-11	NA NA		-	l	
1			Indeno(1,2,3-cd)pyrene		2E-11		*	2E-11	NA ONE				
4	1		Arsenic		9E-08			9E-08	Skin, CVS		0.09		0.09
1	1		Beryllium	ll	1E-08			1E-08	Respiratory		0.01	-	0.01
1			Cadmium		3E-08			3E-08	Kidney, Respiratory		0.06		0.06
1			Chromium VI	<b>!</b>	9E-06			9E-06	Respiratory		0.08	1	0.08
1			Cobalt		2E-07			2E-07	Respiratory		0.08		0.08
1			Iron						NA.				
l)			Lead	l					NA NA				
[]		1	Manganese						CNS		0.8		0.8
H		ŀ	Chemical Total		1E-05		]	1E-05	]		1		1
II.		Exposure Point Total		1				1E-05					1
11	Exposure	Medium Total						1E-05					1
Medium Total	Exposure	J. H. G. G. H. T. Old.		₩		<u>-</u>		1E-05					1
	Subsurface Soil	Former Building 234	Benzo(a)pyrene	1E-08		4E-09	<del></del>	1E-08	NA				
Subsurface Soil	Subsurface Soil	Former building 234	Aluminum			4E-09		12-00	CNS	0.02			0.02
ii		1			1	8E-08		9E-07	Skin, CVS	0.02		0.01	0.1
11		1	Arsenic	8E-07 3E-07		8E-08		3E-07	None Specified	0.002		0.01	0.002
li .			Chromium VI	II.		1		3E-07	Thyroid	0.002			0.002
li .			Cobalt		1	i				0.007			0.08
N .	1		Iron						GS		"		
11			Manganese	1					CNS	0.05			0.05
11			Chemical Total	1E-06		8E-08		1E-06		0.3	<u> </u>	0.01	0.3
ii .	<u> </u>	Exposure Point Total		l				1E-06	JL				0.3
II	Evnosur	e Medium Total		1				1E-06					0.3

#### TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES

#### REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future Receptor Population: Construction Workers

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	Former Building 234	Benzo(a)pyrene		7E-11			7E-11	NA				
		1	Aluminum	1					CNS		0.2		0.2
		1	Arsenic		1E-07			1E-07	Skin, CVS		0.1		0.1
	ŀ	1	Chromium V1		3E-06			3E-06	Respiratory		0.02		0.02
		ı	Cobalt		1E-07			1E-07	Respiratory		0.06		0.06
		i	Iron				}		NA NA				
		i	Manganese	J			I		CNS		1		11
		L	Chemical Total		3E-06			3E-06			2		2
		Exposure Point Total	<u> </u>	7				3E-06					2
	Exposure	Medium Total						3E-06					2
Medium Total								4E-06					2
Groundwater	Groundwater	Former Building 234	Icis-1,2-Dichloroethene		i		T		Kidney	0.0002		0.0010	0.001
iodiowale:	Groundwater	1 omici banding 204	Trichloroethene	7E-10		4E-09	l I	5E-09	Liver, Kidney	0.002	ł I	0.01	0.02
			Vinyl Chloride	7E-10		2E-09	l !	3E-09	Liver	0.0002		0.0007	0.0009
			Aluminum	72.10		22.00	l !		CNS	0.00001	ł	0.000007	0.00002
			Arsenic	7E-09		4E-09	l i	1E-08	Skin, CVS	0.001		0.0006	0.002
			Cobalt				l [		Thyroid	0.0001		0.00003	0.0002
	1		Iron						GS	0.0002		0.00009	0.0003
			Manganese				l i		CNS	0.006		0.07	0.08
			Chemical Total	9E-09		1E-08	Î	2E-08		0.009		0.09	0.10
		Exposure Point Total	Chomical Fora:	╡	·	12 00	·	2E-08					0.10
	Exposure	Medium Total		╬───				2E-08	-				0.10
	Air	Former Building 234	Icis-1,2-Dichloroethene	<del>                                     </del>		<del></del>	1		NA NA				
		1 Sililer Building 254	Trichloroethene		9E-10	-	1	9E-10	Liver, Kidney		0.00003		0.00003
	i		Vinvl Chloride	I	9E-11		1 I	9E-11	Liver		0.00002		0.00002
	i i		Aluminum	l			l I		CNS				
			Arsenic	i		**	l l		Skin, CVS				
			Cobalt	I			l I		Respiratory				
		1	tron	I					NA NA				
		1	Manganese						CNS				
	1		Chemical Total	<del> </del>	1E-09		1 <u> </u>	1E-09	i		0.00005		0.00005
	1	Exposure Point Total	position rotal	┪	, , , , , ,		·	1E-09		·			0.00005
	Exposure Medium Total		···	1				1E-09					0.00005
ledium Total	1							2E-08					0.10
Receptor Total				Total Car	cer Hisks for S	urface Soil and	Groundwater	1E-05	Total Haza	rd Indices for S	urface Soil and	Groundwater	1
Receptor Total		· <del>-</del>			Risks for Subs			4E-06	Total Hazard Indices for Surface Soil and Groundwa Total Hazard Indices for Subsurface Soil and Groundwa				2

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organ His - Surface Soil and Groundwater Total CNS HI 0.9 Total CVS HI 0.2 Total GS HI 0.07 Total Kidney HI 0.1 Total Liver HI 0.02 Total Respiratory HI 0.2 0.008 Total None Specified HI Total Skin HI 0.2

0.01

Total Thyroid HI

Target Organ HIs - Subsurface Soil and Groundwater Total CNS HI Total CVS HI 0.3 Total GS HI 0.08 Total Kidney HI 0.02 Total Liver HI 0.02 Total Respiratory HI 0.08 Total None Specified HI 0.002 Total Skin HI 0.3 Total Thyroid HI 0.008

#### TABLE 9.10.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child PAGE 1 OF 2

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	1E-06		5E-07		2E-06	NA NA				
	ŀ	!	Benzo(a)pyrene	1E-05		4E-06	!	2E-05	NA NA				
	į	j	Benzo(b)fluoranthene	2E-06		7E-07		3E-06	NA NA		'		**
	l		Chrysene	2E-08		6E-09		2E-08	NA NA			i	
			Dibenzo(a,h)anthracene	3E-06		1E-06		4E-06	NA NA				
			Indeno(1,2,3-cd)pyrene	8E-07		3E-07		1E-06	NA NA				
	1		Arsenic	3E-05		2E-06		3E-05	Skin, CVS	0.7		0.06	0.8
	1		Beryllium						GS	0.02			0.02
			Cadmium	1					Kidnev	0.3		0.02	0.4
			Chromium VI	3E-04			l	3E-04	None Specified	0.4			0.4
			Cobalt	0					Thyroid	0.8			0.8
			Iron						GS	0.5			0.5
			Lead	1					NA NA			l	
		i		I			"		CNS	0.3		-	0.3
•	]		Manganese	25.04					il civo			0.00	3
			Chemical Total	3E-04	=	9E-06		3E-04	<b> </b>	3		0.08	
		Exposure Point Total		<u>l                                      </u>				3E-04					3
į	Exposu	re Medium Total		<u> </u>				3E-04					3
	Air	Former Building 234	Benzo(a)anthracene		1E-12			1E-12	NA				
l .	i	1	Benzo(a)pyrene		1E-11			1E-11	NA NA				
i	i		Benzo(b)fluoranthene		2E-12		l	2E-12	ll NA				
	1		Chrysene		2E-13			2E-13	NA NA				ł <u></u>
			Dibenzo(a,h)anthracene		3E-12			3E-12	NA.		}		
	ļ.		Indeno(1,2,3-cd)pyrene		8F-13			8E-13	NA NA		i	!	
	1		Arsenic		5E-10		l	5E-10	Skin, CVS		0.00010	l	0.00010
	!		Bervilium		6E-11			6E-11	Respiratory		0.00002		0.00002
			Cadmium	i	2E-10			2E-10	Kidney, Respiratory		0.00002		0.00002
	i		Chromium VI	ll .	3E-07			3E-07	Respiratory	l ".	0.00008	l ::	0.00008
							1	1E-09	Respiratory		0.0003		0.0003
			Cobalt		1E-09			i e	NA NA				0.0003
	i		Iron							1			
1	1		Lead						NA ONE				
	1		Manganese						CNS		0.0008		0.0008
			Chemical Total	]	3E-07			3E-07			0.001	l	0.001
ı		Exposure Point Total						3E-07					0.001
	Exposu	re Medium Total		1				3E-07					0.001
Medium Total			<del></del>					3E-04					3
Subsurface Soil	ISubsurface Soil	Former Building 234	Benzo(a)pyrene	2E-06		9E-07		3E-06	NA NA		T		
Guosuriace Soli	Subsurface 30il	1 officer building 234	Aluminum	22-00		3L-07		3L-00	CNS	0.2			0.2
		1	Arsenic	4E-05	1	3E-06		4E-05	Skin, CVS	1.0		0.08	I 4
	1	1											'-
			Chromium VI	7E-05				7E-05	None Specified	0.1			0.1
1		l	Cobalt						Thyroid	0.6			0.6
	1	1	Iron				1		GS	0.6			0.6
l		1	Manganese						CNS	0.4			0.4
	1	L	Chemical Total	1E-04		4E-06		1E-04	1	3	-	0.08	3
	1	Exposure Point Total		1				1E-04	1				3
	Evnosu	re Medium Total	<del></del>	<del></del>				1E-04	1				3
	<u>LADOSU</u>	o modum rotal							<del>,</del>				

#### TABLE 9.10.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child PAGE 2 OF 2

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenic	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Tota
ubsurface Soil	Air	Former Building 234	Benzo(a)pyrene		2E-12			2E-12	NA				
	i		Aluminum				l i		CNS		0.0002		0.0002
			Arsenic		7E-10		-	7E-10	Skin, CVS		0.0001		0.0001
			Chromium VI		9E-08			9E-08	Respiratory		0.00002		0.00002
			Cobalt		9E-10			9E-10	Respiratory		0.0002		0.0002
	1		Iron						NA NA				
			Manganese						CNS		0.001		0.001
	1		Chemical Total		9E-08			9E-08			0.002		0.002
	l	Exposure Point Total						9E-08					0.002
	Exposure	Medium Total						9E-08					0.002
ledium Total								1E-04					3
roundwater	Groundwater	Former Building 234	cis-1,2-Dichloroethene				Ti		Kidney	0.4		0.05	0.5
		1	Trichloroethene (Mutagenic)	1E-06		2E-07		1E-06	NA NA				
			Trichloroethene (Nonmutagenic	8E-07		1E-07	[	9E-07	ne System, Developm	0.5		0.08	0.6
			Vinyl Chloride	1E-05		7E-07		1E-05	Liver	0.006		0.0003	0.006
			Aluminum		-				CNS	0.003		0.00002	0.003
			Arsenic	1E-05	l [	7E-08		1E-05	Skin, CVS	0.3		0.002	0.3
			Cobalt						Thyroid	0.4		0.0010	0.4
			Iron						GS	0.04		0.0003	0.04
	l e e e e e e e e e e e e e e e e e e e	1	Manganese				]		CNS	1		0.2	2
	ľ		Chemical Total	3E-05		1E-06		3E-05		3		0.4	3
	<u> </u>	Exposure Point Total						3E-05					3
	Exposure	Medium Total						3E-05					3
	Air	Former Building 234	cis-1,2-Dichloroethene						NA NA				
	ľ	{	Trichloroethene (Mutagenic)		9E-07			9E-07	NA NA				
	i e	1	Trichloroethene (Nonmutagenid		5E-07		l 1	5E-07	Liver, Kidney		0.9		0.9
		1	Vinyl Chloride		6E-07		l 1	6E-07	Liver		0.001		0.001
		l .	Aluminum						CNS				
	I	1	Arsenic						Skin, CVS		}		
	l l	1	Cobalt						Respiratory				
	i i	1	tron						NA NA				
	ŀ	1	Manganese						CNS				
	1		Chemical Total		2E-06			2E-06			0.9		0.9
	<u> </u>	Exposure Point Total						2E-06					0.9
	Exposure Medium Tota							2E-06					0.9
edium Total								3E-05					4
eceptor Total	<del></del>			Total Car	cer Risks for St	rface Soil and	Groundwater	3E-04	Total Hazar	d Indices for S	urface Soil and	Groundwater	7
eceptor Total				Total Canasa	Risks for Subsu	rdage Cell and	Croundwater	1E-04	Total Hazard In	dioon for Cuba	urface Cail and	Groundwater	7

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organ His - Su	rface Soil and Grou	ndwate
Total CNS HI	2	
Total CVS HI	1	
Total Developmental HI	0.6	
Total GS HI	0.6	
Total Kidney HI	2	
Total Liver HI	0.9	l
Total Respiratory HI	0.0004	
Total None Specified HI	0.4	

Target Organ His - Subsurface Soil and Groundwater						
Total CNS HI	2					
Total CVS HI	1					
Total Developmental HI	0.6					
Total GS HI	1					
Total Kidney HI	1					
Total Liver HI	0.9					
Total Respiratory HI	0.0002					
Total None Specified HI	0.1					

#### TABLE 9.11.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult PAGE 1 OF 2

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotlent				
	Wediam			Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	2E-07		1E-07		3E-07	NA NA				-
		_	Benzo(a)pyrene	2E-06		9E-07		3E-06	NA	-			
			Benzo(b)fluoranthene	3E-07		1E-07	·	4E-07	NA				
ľ			Chrysene	2E-09		1E-09		3E-09	NA NA	1			
	į.	•	Dibenzo(a,h)anthracene	4E-07		2E-07		6E-07	NA NA				
	1		Indeno(1,2,3-cd)pyrene	1E-07		6E-08		2E-07	NA		1 '		
			Arsenic	1E-05		1E-06		1E-05	Skin, CVS	0.07	- 1	0.009	0.08
	i		Beryllium						GS	0.002			0.002
	1		Cadmium						Kidney	0.04		0.003	0.04
			Chromium VI	4E-05				4E-05	None Specified	0.04			0.04
			Cobalt				l I	**	Thyroid	0.08			0.08
			Iron						ĠS	0.06			0.06
1			Lead						NA				
t	1		Manganese						CNS	0.03			0.03
	1		Chemical Total	5E-05		3E-06		6E-05		0.3		0.01	0.3
	1	Exposure Point Total		┪——			1	6E-05					0.3
	Exposure	e Medium Total		<del></del>	66							0.3	
A	Air	Former Building 234	Benzo(a)anthracene	<del></del>	2E-12			2E-12	NA NA		T		
1	[Aii	1 officer building 234	Benzo(a)pyrene	-	2E-11		ł l	2E-11	NA				
			Benzo(b)fluoranthene		3E-12		l	3E-12	NA.	1			
i			Chrysene		2E-13			2E-13	NA.				
	1		Dibenzo(a,h)anthracene		4E-12		ł I	4E-12	NA NA				
			Indeno(1,2,3-cd)pyrene		1E-12		_	1E-12	NA.				
			Arsenic		2E-09			2E-09	Skin, CVS		0.00010		0.00010
l			Beryllium		3E-10			3E-10	Respiratory		0.00002		0.00002
			Cadmium	I ::	7E-10			7E-10	Kidney, Respiratory		0.00006		0.00006
			Chromium VI		4E-07			4E-07	Respiratory		0.00008		0.00008
l			Cobalt	:	5E-09			5E-09	Respiratory	1 -	0.0003		0.0003
i				1 :	5E-09		·		NA NA		0.0000		0.0000
			Iron Lead						l NA	1			
l						-	"		CNS		0.0008		0.0008
		i	Manganese Chemical Total		4E-07		<del> </del>	4E-07	0143	<del></del>	0.000		0.001
1			Chemical Fotal		4E-07		<u> </u>	4E-07			0.001		0.001
		Exposure Point Total	***.**					4E-07	***				0.001
	Exposur	e Medium Total								<del></del>			
Medium Total								6E-05			· · · · · · · · · · · · · · · · · · ·		0.3
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	3E-07		2E-07		5E-07	NA				
1.	1	1	Aluminum						CNS	0.02			0.02
I	1		Arsenic	2E-05		2E-06		2E-05	Skin, CVS	0.1		0.01	0.1
l .	1		Chromium VI	1E-05			'	1E-05	None Specified	0.01			0.01
1	1		Cobalt				*-		Thyroid	0.06			0.06
i	ŀ		Iron						GS	0.06			0.06
	1		Manganese						CNS	0.04			0.04
1	1		Chemical Total	3E-05	**	2E-06		3E-05		0.3	l	0.01	0.3
1	L	Exposure Point Total						3E-05					0.3
.1		e Medium Total						3E-05					0.3

#### TABLE 9.11.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	Former Building 234	Benzo(a)pyrene		3E-12			3E-12	NA NA				
	1	1	Aluminum		- +				CNS		0.0002		0.0002
	1		Arsenic		3E-09	ļ		3E-09	Skin, CVS		0.0001		0.0001
			Chromium VI		1E-07			1E-07	Respiratory		0.00002		0.00002
		1	Cobalt		4E-09			4E-09	Respiratory		0.0002		0.0002
	l.	1	Iron						NA NA			-	
	1	1	Manganese						CNS		0.001		0.001
	1		Chemical Total		1E-07			1E-07			0.002		0.002
		Exposure Point Total		L				1E-07	J				0.002
	Exposure	Medium Total					1E-07					0.002	
Medium Total								3E-05					0.3
Groundwater	Groundwater	Former Building 234	cis-1,2-Dichloroethene		<del></del>				Kidney	0.2		0.02	0.2
	1	1	Trichloroethene (Mutagenic)	6E-07		1E-07		7E-07	NA NA				
			Trichloroethene (Nonmutagenio			2E-07		2E-06	Immune System, Developmental	0.2		0.04	0.2
			Vinyl Chloride	2E-06	¥-	9E-08	]	2E-06	Liver	0.002		0.0001	0.003
			Aluminum						CNS	0.001		0.000008	0.001
			Arsenic	2E-05		1E-07		2E-05	Skin, CVS	0.1		0.0006	0.1
			Cobalt						Thyroid	0.2		0.0003	0.2
			Iron		-				GS	0.02		0.00009	0.02
			Manganese						CNS	0.6		0.08	0.7
	-		Chemical Total	2E-05	<u></u>	5E-07		2E-05		1		0.1	
	Exposure Point Total						2Ë-05					1	
	Exposure	Medium Total				<u> </u>		2E-05	L				11
	Air	Former Building 234	cis-1,2-Dichloroethene						NA		-		
		1	Trichloroethene (Mutagenic)		1E-06			1E-06	NA NA				
		1	Trichloroethene (Nonmutagenic		2E-06			2E-06	Liver, Kidney		0.9	-	0.9
		<b>)</b>	Vinyl Chloride		2E-07			2E-07	Liver		0.001		0.001
		<b>}</b>	Aluminum						CNS Skin, CVS			-	_
	ı		Arsenic		1								
	1	1	Cobalt						Respiratory NA	-			
	i	i	Iron				-		CNS				
	1	i	Manganese						4 CNS		0.9		
	i		Chemical Total		3E-06			3E-06	<b></b>		0.9		0.9
	<u> </u>	Exposure Point Total						3E-06					0.9
	Exposure Medium Total			<u> </u>				3E-06					0.9
Medium Total								3E-05					2
Receptor Total				Total Cancer Risks for Surface Soil and Groundwater			8E-05			Surface Soil and			
Receptor Total				Total Cance	r Risks for Subs	surface Soil and	Groundwater	6Ë-05	Total Hazard I	ndices for Sub	surface Soil and	Groundwater	3

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Jyens (2005).						
Target Organ His - Surface Soil and Groundwater						
Total CNS HI	0.7					
Total CVS HI	0.2					
Total Developmental HI	0.2					
Total GS HI	0.08					
Total Kidney HI	1					
Total Liver HI	0.9					
Total Respiratory HI	0.0004					
Total None Specified HI	0.04					
Total Skin HI	0.2					
Total Thyroid Hi	0.2					

Target Organ His - Subsurface Soil and Groundwater						
Total CNS HI	0.7					
Total CVS HI	0.2					
Total Developmental HI	0.2	İ				
Total GS HI	0.1	!				
Total Kidney HI	1					
Total Liver HI	0.9					
Total Respiratory HI	0.0002					
Total None Specified HI	0.01					
Total Skin Hi	0.2					

Total Thyroid Hi

# TABLE 9.12.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Lifelong (Child and Adult) PAGE 1 OF 2

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	1E-06		6E-07		2E-06					
			Benzo(a)pyrene	1E-05		5E-06		2E-05		i			
			Benzo(b)fluoranthene	2E-06		8E-07		3E-06		ı			
			Chrysene	2E-08		7E-09		2E-08	1				
		i	Dibenzo(a,h)anthracene	3E-06		1E-06		4E-06	li e				
			Indeno(1,2,3-cd)pyrene	9E-07		3E-07		1E-06					1
			Arsenic	4E-05		4E-06		4E-05		1			ł
			Beryllium						il .	1	i		l
			Cadmium							i	{		
			Chromium VI	3E-04			**	3E-04		1	1		
			Cobalt							ł			
1	1		Iron							1			1
	1		Lead										1
			Manganese						J				
	1		Chemical Total	4E-04		1E-05		4E-04	]				
		Exposure Point Total	<del></del>					4E-04					
	Exposure	e Medium Total						4E-04	) <del></del>				
	Air	Former Building 234	Benzo(a)anthracene		3E-12			3E-12	l		1		T
	·		Benzo(a)pyrene	H	3E-11			3E-11	li	1	i		
			Benzo(b)fluoranthene		4E-12			4E-12		l			
			Chrysene		4E-13			4E-13	li	l .	i		
ł			Dibenzo(a,h)anthracene	I	7E-12			7E-12		1	i		
1			Indeno(1,2,3-cd)pyrene	1	2E-12			2E-12		1			
			Arsenic		3E-09			3E-09		ŀ			
			Beryllium		3E-10			3E-10		ł			
			Cadmium		9E-10			9E-10	1	1	1		
			Chromium VI		7E-07			7E-07	i	1	}		
			Cobalt	l	6E-09			6E-09	i	1	)		
			Iron		02.00					1			
			Lead							1	l '		
			Manganese										
			Chemical Total	╣	7E-07			7E-07	1		<del> </del>		
.1	ı	Exposure Point Total	Notientical Folar	<del></del>	/ E-U/		<del></del>	7E-07	<del> </del>	ــــــــــــــــــــــــــــــــــــــ	L		
				<del></del>				7E-07					<u> </u>
	<u>I</u> Exposure	e Medium Total	<del></del>										
Medium Total			75	05.05		I IF as		4E-04	<b> </b>		1		<u> </u>
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	3E-06		1E-06		4E-06		1	1		
1		ı	Aluminum										
		ı	Arsenic	5E-05	**	5E-06		6E-05	1				
		1	Chromium VI	9E-05				9E-05	1			ŀ	1
1		ı	Cobalt							ŀ		ŀ	l
l		1	Iron							i		İ	
		1	Manganese						<u> </u>	L	ļ	ļ	<u></u>
l			Chemical Total	1E-04		6E-06		1E-04	J	L		<u> </u>	
l	<u> </u>	Exposure Point Total						1E-04					
ı		e Medium Total	~ ~ ~					1Ë-04					1

# TABLE 9.12.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Tota
Subsurface Soil	Air	Former Building 234	Benzo(a)pyrene		6E-12			6E-12		I			
		-	Aluminum	**						i			
			Arsenic		4E-09			4E-09	<u>U</u>				
			Chromium VI		2E-07			2E-07	li de la companya de la companya de la companya de la companya de la companya de la companya de la companya de	1	1		
			Cobalt		4E-09			4E-09		1	{		i
			fron							1			
			Manganese		 05.03			7.	4				<del></del>
			Chemical Total		2E-07			2E-07	ļ	l	l		
		Exposure Point Total						2E-07	ļ				<u> </u>
., -	Exposure	Medium Total						2E-07					
Medium Total	·							1E-04		<del></del>			<u> </u>
Groundwater	Groundwater	Former Building 234	cis-1,2-Dichloroethene						1				
	<b>+</b>	ļ	Trichloroethene (Mutagenic)	2E-06		3E-07		2E-06	1				
	i i	1	Trichloroethene (Nonmutagenid Vinyl Chloride	2E-06 2E-05		4E-07 8E-07		2E-06 2E-05	il .				
	•		Aluminum	2E-05		8E-07		2E-05	1				
			Arsenic	3E-05		2E-07		3E-05	1				
			Cobalt	32-03		22-07		3L-03	i				
			tron										
			Manganese				l I						
			Chemical Total	5E-05		2E-06	1	5E-05	i				
		Exposure Point Total	orientida i otal	02 00	···	22 00		5E-05	· · · · · · · · · · · · · · · · · · ·				
	Exposure	Medium Total						5E-05	i		<del></del>		í
	Air	Former Building 234	cis-1,2-Dichloroethene								1		
	<b> </b> ^"	Tomici Ballaling 204	Trichloroethene (Mutagenic)		2E-06			2E-06	i	1	i		1
	1		Trichloroethene (Nonmutagenic		2E-06			2E-06		1			j
			Vinyl Chloride		8E-07		l [	8E-07					1
			Aluminum										
			Arsenic					¥ -	1				
			Cobalt						1		l		
			Iron						ll .	l			
			Manganese						1				
			Chemical Total		5E-06	~~		5E-06			l		
	<u> </u>	Exposure Point Total						5E-06	J				
	Exposure Medium Tota							5E-06					
ledium Total								6E-05					
eceptor Total				Total Car	ncer Risks for S	urface Soil and	Groundwater	4E-04					
eceptor Total					Risks for Subs			2E-04	1	, ,			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



#### LIST OF TABLES RAGS PART D TABLE 9 - SOUTH WATERFRONT SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

# Pasonable Maximum Exposures 9.1.RME 9.2.RME 9.3.RME 9.4.RME 9.5.RME 9.6.RME 9.7.RME 9.8.RME 9.8.RME 9.8.RME 9.8.RME 9.8.RME 9.1.RME 9

## TABLE 9.1.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	South Waterfront	Aluminum Arsenic Chromium VI Cobalt Iron	1E-06 1E-06 	   	9E-07  	   	2E-06 1E-06  3E-06	CNS Skin, CVS None Specified Thyroid GS	0.004 0.02 0.002 0.02 0.02	   	0.01	0.004 0.03 0.002 0.02 0.02
		Exposure Point Total	Chemical Total	2E-06		9E-07		3E-06		0.06		0.01	0.08
	Exposure N	Medium Total						3E-06					0.08
	Air	South Waterfront	Aluminum Arsenic Chromium VI Cobalt Iron Chemical Total	    	3E-11 1E-09 6E-11  1E-09		   	3E-11 1E-09 6E-11 1E-09	CNS Skin, CVS Respiratory Respiratory NA	    	0.000006 0.000003 0.0000004 0.000008	    	0.00006 0.00003 0.000004 0.000008 
l		Exposure Point Total		<del> </del>				1E-09 1E-09					0.00002
	Exposure N	fedium Total	· · · · · · · · · · · · · · · · · · ·	<del> </del>				1E-09 3E-06					0.00002
Medium Total Receptor Total	<del></del> -			ļ <u> </u>	-	Recer	tor Risk Total	3E-06	<u> </u>		Rece	eptor HI Total	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.2.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum		-				CNS	0.003			0.003
	1		Arsenic	2E-06		2E-07		2E-06	Skin, CVS	0.01		0.002	0.02
i	1		Chromium VI	5E-07				5E-07	None Specified	0.001			0.001
il			Cobalt						Thyroid	0.01	( -		0.01
1	1		Iron				<u> </u>		GS	0.01			0.01
			Chemical Total	2E-06	-	2E-07		3E-06		0.05		0.002	0.05
N		Exposure Point Total						3E-06					0.05
	Exposure I	Medium Total						3E-06					0.05
	Air	South Waterfront	Aluminum	-					CNS	-	0.000006	.,	0.000006
			Arsenic	ll	6E-11			6E-11	Skin, CVS	1	0.000003		0.000003
			Chromium VI	1	9E-10			9E-10	Respiratory		0.0000004		0.0000004
1			Cobalt		1E-10		**	1E-10	Respiratory		0.000008		0.000008
II .			Iron						NA		[		
	1		Chemical Total		1E-09			1E-09			0.00002		0.00002
I	1	Exposure Point Total						1E-09	·				0.00002
	Exposure	Medium Total						1E-09		-			0.00002
Medium Total			•	l		•		3E-06					0.05
Receptor Total						Rece	ptor Risk Total	3E-06			Rece	eptor HI Total	0.05
Notes:													

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.3.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum Arsenic Chromium VI Cobalt Iron	3E-06 2E-06	   	1E-06  	   	4E-06 2E-06 					
	Exposure Point Total	Chemical Total	5E-06	<u> </u>	1E-06		6E-06					<u> </u>	
	Exposure	Medium Total		<del> </del>				6E-06		·			1
Air	Āir	South Waterfront  Exposure Point Total	Aluminum Arsenic Chromium VI Cobalt Iron Chemical Total		9E-11 2E-09 2E-10 3E-09	    		9E-11 2E-09 2E-10 3E-09 3E-09					
<u> </u>	Exposure	Medium Total						3E-09					
Medium Total Receptor Total Notes:					,	Rece	otor Risk Total	6E-06 6E-06		·····			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.4.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenic	Risk		i	Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum				1	* *	CNS	0.02			0.02
		1	Arsenic	1E-05		2E-06	l 1	1E-05	Skin, CVS	0.08		0.02	0.09
	i	1	Chromium VI	3E-06			i I	3E-06	None Specified	0.006			0.006
		1	Cobalt						Thyroid	0.08			0.08
			Iron						GS	0.06			0.06
	1		Chemical Total	2E-05		2E-06		2E-05	}	0.2		0.02	0.3
	Exposure Point Total  Exposure Medium Total				_		2E-05					0.3	
	Exposure	Medium Total		1				2E-05					0.3
	Air	South Waterfront	Aluminum				1		CNS		0.00007		0.00007
			Arsenic		8E-10			8E-10	Skin, CVS		0.00003		0.00003
			Chromium VI	1	1E-08			1E-08	Respiratory		0.000004		0.000004
			Cobalt		2E-09			2E-09	Respiratory		0.00008		80000.0
ı			Iron				l 1		NA NA				
:			Chemical Total		1E-08			1E-08			0.0002		0.0002
	1	Exposure Point Total						1E-08_					0.0002
	Exposure I	Medium Total		j				1E-08					0.0002
Medium Total								2E-05					0.3
Receptor Total	***********					Rece	tor Risk Total	2E-05			Rece	eptor HI Total	0.3
Notes:							<del></del>						

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcir	nogenic Hazard	Quotient	
	, , , , , , , , , , , , , , , , , , ,	13111	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum Arsenic Chromium VI Cobalt Iron	9E-07 2E-07 	   	8E-08  		9E-07 2E-07	CNS Skin, CVS None Specified Thyroid GS	0.03 0.1 0.002 0.01 0.1	   	 0.01   	0.03 0.1 0.002 0.01 0.1
		Exposure Point Total	Chemical Total	1E-06	l	8E-08		1E-06 1E-06		0.3		0.01	0.3
1	Exposure	Medium Total						1E-06					0.3
	Air	South Waterfront	Aluminum Arsenic Chromium VI Cobalt Iron Chemical Total		1E-07 2E-06 3E-07 2E-06	    		1E-07 2E-06 3E-07  2E-06	CNS Skin, CVS Respiratory Respiratory NA	    	0.3 0.1 0.02 0.1 	    	0.3 0.1 0.02 0.1 
l		Exposure Point Total		J				2E-06	<u> </u>				0.5
li .	Exposure	Medium Total						2E-06					0.5
Medium Total Receptor Total				]		Rece	otor Risk Total	3E-06 3E-06			Rec	eptor HI Total	0.8

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	c Risk			Non-Carcin	ogenic Hazard	Quotient	
	Wedani	, onn	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum		-				CNS	0.2			0.2
	l l	ł	Arsenic	4E-05		3E-06	l i	4E-05	Skin, CVS	1 1		0.08	1 1
	1	i	Chromium VI	6E-05			1	6E-05	None Specified	0.08			0.08
	l	1	Cobatt				1		Thyroid	1			1 1
		1	Iron				I L		GS	0.8			0.8
		1	Chemical Total	9E-05		3E-06		1E-04	1	3		0.08	3
		Exposure Point Total						1E-04					3
[	Exposure	Medium Total						1E-04		•			3
	Air	South Waterfront	Aluminum			-			CNS		0.0003		0.0003
		ı	Arsenic		8E-10			8E-10	Skin, CVS		0.0001		0.0001
		1	Chromium VI		6E-08			6E-08	Respiratory		0.00002		0.00002
			Cobalt		2E-09		l i	2E-09	Respiratory		0.0003		0.0003
	ŀ	1	Iron				l 1		NA				
		1	Chemical Total		7E-08		1	7E-08			0.0008		0.0008
		Exposure Point Total				•	·	7E-08					0.0008
	Exposure	Medium Total						7E-08					0.0008
Medium Total								1E-04			· ·		3
Receptor Total						Rece	ptor Risk Total	1E-04			Rec	eptor HI Total	3

Notes:

Total CNS HI	0.2
Total CVS HI	1
Total GS HI	0.8
Total Respiratory HI	0.0004
Total None Specified HI	0.08
Total Skin HI	1
Total Thyroid HI	1

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.7.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential		- "	Carcinogenio	: Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Demnal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	I Aluminum				(Haviativii)	Houles rolai	CNS	0.02			0.02
Cobsumace Com	Cabsarrace con	Codul Wateriori	Arsenic	2E-05		2E-06		2E-05	Skin, CVS	0.1		0.01	0.1
1		1	Chromium VI	8E-06				8E-06	None Specified	0.009		0.01	0.009
1	l.	1	Cobalt						Thyroid	0.1	] }		0.1
1		i	Iron	}					ĞS	0.08			0.08
1			Chemical Total	2E-05		2E-06		3E-05	1	0.3		0.01	0.3
	1	Exposure Point Total		i				3E-05					0.3
	Exposure	Medium Total	•					3E-05		<u>-</u>			0.3
E .	Air	South Waterfront	Aluminum						CNS		0.0003		0.0003
II .	1		Arsenic		3E-09			3E-09	Skin, CVS		0.0001		0.0001
	1		Chromium VI		9E-08			9E-08	Respiratory		0.00002		0.00002
I	i		Cobalt		6E-09			6E-09	Respiratory		0.0003		0.0003
Į.	ŀ		Iron						NA				
	ľ		Chemical Total		1E-07			1E-07			0.0008		0.0008
li .	l	Exposure Point Total		)				1E-07				<u> </u>	0.0008
	Exposure	Medium_Total						1Ē-07					0.0008
Medium Total			-					3E-05					0.3
Receptor Total						Rece	ptor Risk Total	3E-05			Rec	eptor HI Total	0.3
Notes:													

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

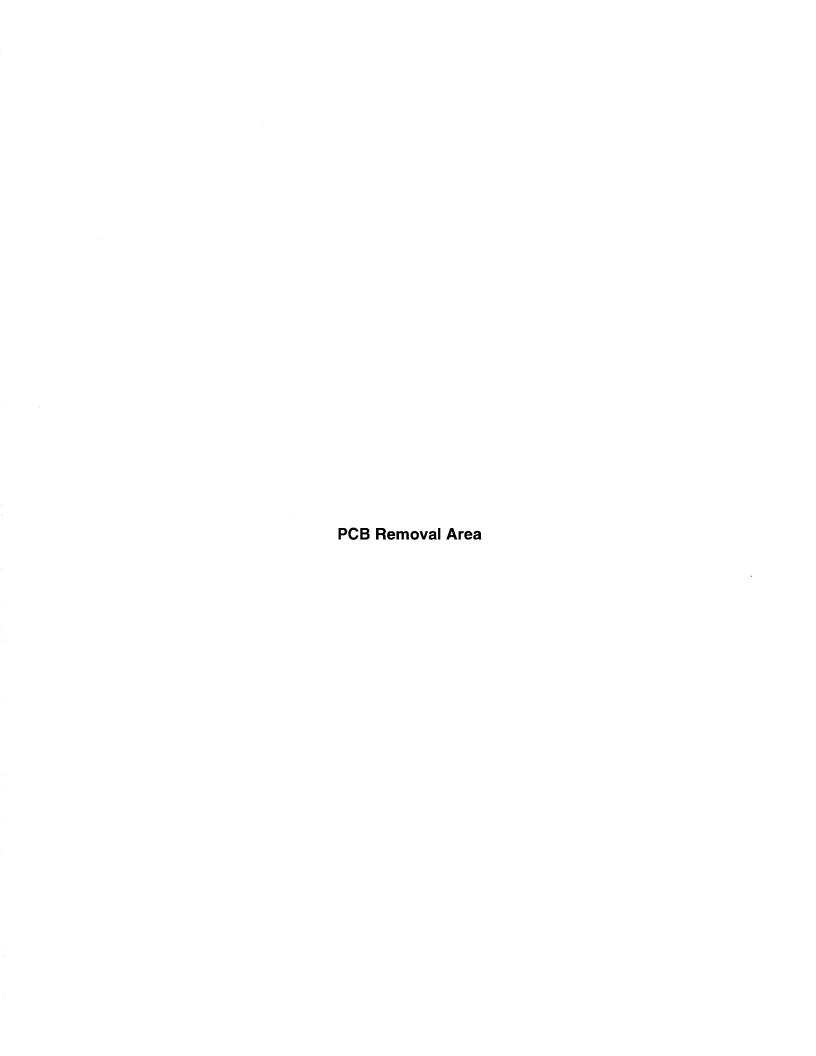
PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum Arsenic Chromium VI Cobalt Iron Chemical Total	6E-05 6E-05   1E-04		5E-06   5E-06		6E-05 6E-05 				-	
il		Exposure Point Total		]				1E-04					
N	Exposure	Medium Total						1E-04					
	Air	South Waterfront	Aluminum Arsenic Chromium VI Cobalt Iron Chemical Total	   	4E-09 2E-07 8E-09 	   	   	4E-09 2E-07 8E-09 					
		Exposure Point Total	Chemical Fotal	<del> </del>	20-07			2E-07		J	<u> </u>	<u> </u>	
1	Exposure	Medium Total		<del> </del>				2E-07					
Medium Total								1E-04					
Receptor Total						Rece	otor Risk Total	1E-04					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



#### LIST OF TABLES RAGS PART D TABLE 9 - PCB REMOVAL AREA SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS

#### Table No. Reasonable Maximum Exposures Current Adolescent Trespassers - PCB Removal Area 9.1.RME Current Adult Trespassers - PCB Removal Area 9.2.RME Current Lifelong Trespassers - PCB Removal Area 9.3.RME 9.4.RME Current Industrial Workers - PCB Removal Area Future Adolescent Trespassers - PCB Removal Area 9.5.RME Future Adult Trespassers - PCB Removal Area 9.6.RME 9.7.RME Future Lifelong Trespassers - PCB Removal Area Future Industrial Workers - PCB Removal Area 9.8.RME Current/Future Construction Workers - North Waterfront 9.9.RME 9.10.RME Hypothetical Child Residents - PCB Removal Area Hypothetical Adult Residents - PCB Removal Area 9.11.RME 9.12.RME Hypothetical Lifelong Residents - PCB Removal Area

## TABLE 9.1.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential	ļ		Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
		,	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCb Removal Area	Benzo(a)anthracene	1E-08		3E-08		4E-08	NA			-	
		1	Benzo(a)pyrene	1E-07	1	3E-07		4E-07	NA				
		1	Benzo(b)fluoranthene	1E-08	l I	4E-08		6E-08	NA NA			[	
	1	1	Benzo(g,h,i)perylene						Kidney	0.0000006		0.000002	0.000002
	i		Benzo(k)fluoranthene	7E-10		2E-09		3E-09	NA NA				[
			Chrysene	1E-10		3E-10	l [	4E-10	NA				
	1		Dibenzo(a,h)anthracene	1E-08		4E-08		6E-08	NA				
			Indeno(1,2,3-cd)pyrene	6E-09		2E-08		2E-08	NA				
			Total Aroclors	2E-09		6E-09		7E-09	NA				
			Arsenic	1E-06		8E-07		2E-06	Skin, CVS	0.02		0.01	0.03
			Cobalt						Thyroid	0.02			0.02
			Iron						GS	0.01			0.01
			Manganese	1			l L		CNS	0.007			0.007
			Chemical Total	1E-06		1E-06	1	3E-06	İ:	0.06		0.01	0.07
		Exposure Point Total						3E-06					0.07
Ţ	Exposure N	Medium Total	<u>-</u> -					3E-06					0.07
	Air	PCb Removal Area	Benzo(a)anthracene		1E-14			1E-14	NA				
	Air		Benzo(a)pyrene		1E-13			1E-13	NA				
			Benzo(b)fluoranthene		2E-14			2E-14	NA				
			Benzo(g,h,i)perylene						NA				
			Benzo(k)fluoranthene	il	8E-15			8E-15	NA				
	1		Chrysene		1E-15			1E-15	NA				
			Dibenzo(a,h)anthracene		2E-14			2E-14	NA NA				
			Indeno(1,2,3-cd)pyrene		7E-15			7E-15	NA				
	]	1	Total Aroclors		4E-15			4E-15	NA				
	1		Arsenic	J	3E-11			3E-11	Skin, CVS		0.000003		0.000003
	1	1	Cobalt	1	6E-11			6E-11	Respiratory		0.000008		0.000008
	1	1	Iron				1		NA				
	1	1	Manganese						CNS		0.00002		0.00002
			Chemical Total	<del></del>	8E-11			8E-11	ĺ		0.00004		0.00004
	<b>!</b>	Exposure Point Total	<b>A</b>	1			·	8E-11		•			0.00004
Ļ	Exposure N	Medium Total	****	ir —				8E-11					0.00004
								3E-06					0.07
Medium Total				ll .			ll l	3E-06					0.07

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.2.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Tota
urface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	5E-09		3E-09	- 1	8E-09	NA NA				*-
	-		Benzo(a)pyrene	5E-08		2E-08		7E-08	NA			l i	
	i		Benzo(b)fluoranthene	7E-09		4E-09		1E-08	NA NA		}		
	i		Benzo(g,h,i)perylene						Kidney	0.0000005		0.0000002	0.0000007
			Benzo(k)fluoranthene	3E-10		2E-10		5E-10	NA		'	l I	
			Chrysene	5E-11		3E-11		8E-11	NA				
	1		Dibenzo(a,h)anthracene	7E-09		4E-09		1E-08	NA			] [	
			Indeno(1,2,3-cd)pyrene	3E-09		1E-09		4E-09	NA				
			Total Aroclors	3E-09		1E-09		4E-09	NA				
		1	Arsenic	2E-06		2E-07		2E-06	Skin, CVS	0.01		0.002	0.02
			Cobalt						Thyroid	0.01			0.01
			Iron						ĠS	0.008			0.008
	1		Manganese				1 1		CNS	0.005		l J	0.005
	1		Chemical Total	2E-06		2E-07		2E-06		0.04		0.002	0.04
		Exposure Point Total		1			1	2E-06			•	1	0.04
	Exposure	Medium Total						2E-06					0.04
	Air	I PCB Removal Area	IBenzo(a)anthracene		8E-15		T	8E-15	NA				
	I		Benzo(a)pyrene		8E-14			8E-14	NA.	]			
	1		Benzo(b)fluoranthene	II	1E-14			1E-14	NA			i - i	
			Benzo(g,h,i)perylene	l					NA NA				
			Benzo(k)fluoranthene		5E-15			5E-15	NA NA	l		l i	
			Chrysene		9E-16		I I	9E-16	NA.				
			Dibenzo(a,h)anthracene		1E-14		1 1	1E-14	NA.			1 1	
	i		Indeno(1,2,3-cd)pyrene		4F-15			4F-15	NA.			1 1	
	i		Total Aroclors		8E-15		l	8E-15	NA				
	i i		Arsenic	i	5E-11		1 1	5E-11	Skin, CVS		0.000003		0.000003
	ı	1	Cobalt	ll	1E-10		1 1	1E-10	Respiratory		0.000008		0.000008
	l l	1	Iron	H			l		NA NA				
			Manganese	l					CNS		0.00002		0.00002
			Chemical Total	<del></del>	2E-10		<del>   </del>	2E-10			0.00004		0.00004
		Exposure Point Total	porterindar rotal	1			<del>'  </del>	2E-10			2.23001		0.00004
	Eynosure	Medium Total		+				2E-10					0.00004
edium Total	Exposate	modium roju		<del></del>				2E-06					0.04
Jurum rotal							ptor Risk Total	2E-06				eptor HI Total	0.04

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.3.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe; Current Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk				ogenic Hazard		
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	2E-08		3E-08		5E-08		[	1		
			Benzo(a)pyrene	1E-07		3E-07		5E-07		l			
			Benzo(b)fluoranthene	2E-08		5E-08		7E-08	ii				
	1		Benzo(g,h,i)perylene						N		i l		i
l			Benzo(k)fluoranthene	1E-09		2E-09		3E-09		i	Į l		l
		i	Chrysene	2E-10		4E-10		5E-10					l
j	}	j	Dibenzo(a,h)anthracene	2E-08	'	4E-08	]	7E-08	1				
İ	1	ì	Indeno(1,2,3-cd)pyrene	9E-09		2E-08	-	3E-08					
		ĺ	Total Aroclors	4E-09		7E-09	-	1E-08					
			Arsenic	3E-06		1E-06	-	4E-06					1
			Cobalt										
	1		Iron										İ
	1		Manganese						4				<del> </del>
	1		Chemical Total	3E-06		1E-06		5E-06	<u> </u>			L	
		Exposure Point Total						5E-06					
	Exposure	Medium Total						5E-06	<u> </u>				<u> </u>
	Air	PCB Removal Area	Benzo(a)anthracene		2E-14			2E-14				ł	{
-			Benzo(a)pyrene		2E-13			2E-13	Į.		1 '		ĺ
			Benzo(b)fluoranthene		3E-14			3E-14					1
	1		Benzo(g,h,i)perylene									ĺ	1
	1		Benzo(k)fluoranthene		1E-14			1E-14					ļ
ì			Chrysene		2E-15			2E-15	Į.			ł	1
i			Dibenzo(a,h)anthracene		3E-14			3E-14					{
1			Indeno(1,2,3-cd)pyrene		1E-14			1E-14		1			
	1	1	Total Aroclors		1E-14			1E-14		1	1		
			Arsenic	-	8E-11			8E-11	1				
	1	1	Cobalt		2E-10			2E-10	-			1	
		1	Iron			**							
	1	1	Manganese						4			ļ	<u></u>
			Chemical Total		3E-10	~-		3E-10				l	<u> </u>
1		Exposure Point Total						3E-10					
	Exposure	Medium Total		1				3E-10					
Medium Total								5E-06					
Receptor Total							otor Risk Total	5E-06					1

Notes:

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.4.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Tota
urface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	3E-08		3E-08	1	6E-08	NA NA				
			Benzo(a)pyrene	3E-07		3E-07		6E-07	NA NA				
		i	Benzo(b)fluoranthene	5E-08		4E-08		9E-08	NA NA				
			Benzo(g,h,i)perylene				}		Kidney	0.000002		0.000002	0.000004
	i		Benzo(k)fluoranthene	2E-09		2E-09		4E-09	NA NA				
	1		Chrysene	4E-10		3E-10		7E-10	NA				
	1		Dibenzo(a,h)anthracene	4E-08		4E-08		8E-08	NA				
	1		Indeno(1,2,3-cd)pyrene	2E-08		2E-08		3E-08	NA				
			Total Aroclors	2E-08		2E-08		3E-08	NA NA				
			Arsenic	1E-05		2E-06		1E-05	Skin, CVS	0.07		0.01	0.08
			Cobalt						Thyroid	0.07			0.07
			Iron						GS	0.04			0.04
		i	Manganese				1		CNS	0.03			0.03
		1	Chemical Total	1E-05		3E-06		1E-05	l	0.2		0.01	0.2
		Exposure Point Total						1E-05					0.2
	Exposure	e Medium Total		]				1E-05					0.2
	Air	PCB Removal Area	Benzo(a)anthracene		1E-13			1E-13	NA NA			-	
		1	Benzo(a)pyrene		1E-12			1E-12	NA NA				
		i	Benzo(b)fluoranthene		1E-13			1E-13	NA NA				
		1	Benzo(g,h,i)perylene						NA NA				
		1	Benzo(k)fluoranthene		7E-14			7E-14	NA NA				
		1	Chrysene		1E-14			1E-14	NA NA				
		1	Dibenzo(a,h)anthracene		2E-13			2E-13	NA NA				
		1	Indeno(1,2,3-cd)pyrene		6E-14			6E-14	NA NA				
		ł	Total Aroclors		1E-13			1E-13	NA				
		l	Arsenic		7E-10		i I	7E-10	Skin, CVS		0.00003		0.00003
			Cobalt		2E-09			2E-09	Respiratory	-	0.00008		0.00008
			Iron				}		NA NA				
			Manganese				] ]		CNS		0.0003		0.0003
			Chemical Total		2E-09			2E-09			0.0004		0.0004
		Exposure Point Total		1	•-			2E-09					0.0004
	Exposure	e Medium Total						2E-09					0.0004
								1E-05					0.2
dium Total					_			1E-05					Ų.Z

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent PAGE 1 OF 2

Medium	Exposure Medium	Exposure Point	Chemical of Potential	i		Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Demai	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	5E-07		1E-06		2E-06	NA				
		1	Benzo(a)pyrene	4E-06		1E-05		2E-05	NA				l
		1	Benzo(b)fluoranthene	6E-07		2E-06		2E-06	NA		}		
İ	i	1	Benzo(g,h,i)perylene						Kidney	0.00002		0.00005	0.00007
		1	Benzo(k)fluoranthene	2E-08		6E-08		8E-08	NA NA				
		1	Chrysene	5E-09		1E-08		2E-08	NA NA				
1		1	Dibenzo(a,h)anthracene	7E-07		2E-06		3E-06	NA NA				
I		i	Indeno(1,2,3-cd)pyrene	2E-07		5E-07		7E-07	NA NA				
ļ		1	Total Aroclors	3E-08		1E-07		1E-07	NA NA		**		i
		1	Arsenic	1E-06		8E-07	]	2E-06	Skin, CVS	0.02		0.01	0.03
		1	Cobalt	i					Thyroid	0.02			0.02
		1	Iron						GS	0.01			0.01
		1	Manganese				I I		CNS	0.007			0.007
1			Chemical Total	7E-06		2E-05		3E-05		0.06		0.01	0.07
		Exposure Point Total				·		3E-05					0.07
	Exposure	Medium Total						3E-05					0.07
	Air	PCB Removal Area	Benzo(a)anthracene		5E-13		1	5E-13	NA				
		1	Benzo(a)pyrene		5E-12		1	5E-12	NA NA				
		1	Benzo(b)fluoranthene		7E-13			7E-13	NA NA				
		i	Benzo(g,h,i)perylene						NA NA				
I		1	Benzo(k)fluoranthene		2E-13			2E-13	NA NA		:		
ſ		1	Chrysene		5E-14			5E-14	NA NA				
l		1	Dibenzo(a,h)anthracene		8E-13			8E-13	NA				
		1	Indeno(1,2,3-cd)pyrene		2E-13			2E-13	NA NA				
I		1	Total Aroclors		7E-14			7E-14	NA				i
		1	Arsenic		3E-11		-	3E-11	Skin, CVS		0.000003		0.000003
		1	Cobalt		6E-11		-	6E-11	Respiratory		0.000008		0.000008
	1	1	Iron						NA NA				
	1	}	Manganese						CNS		0.00002		0.00002
	1		Chemical Total	]	9E-11			9E-11			0.00004		0.00004
		Exposure Point Total						9E-11					0.00004
	Exposure	Medium Total		I				9Ē-11					0.00004
Medium Total								3E-05					0.07

## TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Tota
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	1E-08		3E-08	"	5E-08	NA				
			Benzo(a)pyrene	1E-07		4E-07		5E-07	NA				
	·	l .	Benzo(b)fluoranthene	3E-08		8E-08		1E-07	NA NA				
		1	Dibenzo(a,h)anthracene	4E-08		1E-07		1E-07	NA NA				
			Aluminum						CNS	0.004	i I		0.004
	1		Arsenic	2E-06		1E-06		3E-06	Skin, CVS	0.03		0.02	0.05
			Chromium VI	1E-06	**			1E-06	None Specified	0.002			0.002
	1		Cobalt						Thyroid	0.02			0.02
			Iron						ĠS	0.01			0.01
			Manganese						CNS	0.010			0.010
			Chemical Total	3E-06		2E-06		5E-06	j	0.08		0.02	0.10
		Exposure Point Total						5Ē-06					0.10
	Exposure	Medium Total						5E-06					0.10
	Air	PCB Removal Area	Benzo(a)anthracene	T	1E-14			1E-14	NA				
	1		Benzo(a)pyrene		2E-13			2E-13	NA		'		
	1		Benzo(b)fluoranthene		3E-14			3E-14	NA				
			Dibenzo(a,h)anthracene		5E-14		[	5E-14	NA	1			
			Aluminum				[		CNS		0.000006		0.000006
			Arsenic		4E-11			4E-11	Skin, CVS	-	0.000005		0.000005
	l l		Chromium VI		1E-09			1E-09	Respiratory		0.0000004		0.0000004
	ŀ		Cobalt		5E-11			5E-11	Respiratory		0.000006		0.000006
	1	1	Iron					••	NA NA			**	
		1	Manganese						CNS		0.00003		0.00003
	İ		Chemical Total	1	1E-09		I	1E-09	i		0.00005		0.00005
		Exposure Point Total	<u> </u>	<u> </u>				1E-09					0.00005
	Exposure	Medium Total						1E-09					0.00005
ledium Total			•					5E-06	I			-	0.10

rvues.
1 - Mutagnic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	2E-07		1E-07		3E-07	NA				
l			Benzo(a)pyrene	2E-06		1E-06		3E-06	NA NA				
1	1		Benzo(b)fluoranthene	3E-07		1E-07		4E-07	NA NA	l			
			Benzo(g,h,i)perylene						Kidney	0.00001		0.000007	0.00002
			Benzo(k)fluoranthene	1E-08		5E-09		1E-08	NA NA				
	•	]	Chrysene	2E-09		1E-09		3E-09	NA NA		i		
	i		Dibenzo(a,h)anthracene	3E-07		2E-07		5E-07	NA NA				
	l		Indeno(1,2,3-cd)pyrene	8E-08		4E-08		1E-07	NA NA				
	ľ		Total Aroctors	4E-08		2E-08		7E-08	NA NA			i	
			Arsenic	2E-06		2E-07		2E-06	Skin, CVS	0.01		0.002	0.02
			Cobalt						Thyroid	0.01			0.01
			Iron						GS	0.009			0.009
	i		Manganese	J			1	* -	CNS	0.005			0.005
	j		Chemical Total	5E-06		2E-06		6E-06		0.04		0.002	0.04
		Exposure Point Total		N .				6E-06					0.04
1	Exposure	Medium Total						6E-06					0.04
	Air	PCB Removal Area	Benzo(a)anthracene		4E-13	*-		4E-13	NA	-			
	Į.		Benzo(a)pyrene		3E-12			3E-12	NA				
			Benzo(b)fluoranthene		4E-13			4E-13	NA				
		•	Benzo(g,h,i)perylene			**			NA NA				
	ľ	1	Benzo(k)fluoranthene		2E-13			2E-13	NA NA				
ľ	ľ	i i	Chrysene		4E-14			4E-14	NA NA				
		<u>}</u>	Dibenzo(a,h)anthracene		6E-13			6E-13	NA				
			Indeno(1,2,3-cd)pyrene		1E-13			1E-13	NA NA				
	r		Total Aroclors		1E-13			1E-13	NA NA				
		ı	Arsenic	i	5E-11		[	5E-11	Skin, CVS		0.000003		0.000003
l	ĺ	!	Cobalt		1E-10			1E-10	Respiratory		800000.0		0.000008
1			Iron						NA NA				
]	i		Manganese				]		CNS		0.00002		0.00002
	1		Chemical Total	i	2E-10			2E-10	]		0.00004		0.00004
	1	Exposure Point Total		i	•			2E-10					0.00004
	Exposure	Medium Total						2E-10					0.00004
Medium Total				<del> </del>				6E-06					0.04

## TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential	ł		Carcinogenio	: Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	6E-09		3E-09		9E-09	NA				
			Benzo(a)pyrene	7E-08		3E-08		1E-07	NA NA				
			Benzo(b)fluoranthene	1E-08		7E-09		2E-08	NA				
	1		Dibenzo(a,h)anthracene	2E-08		9E-09		3E-08	NA NA		1		
	i		Aluminum	<b> </b>					CNS	0.003			0.003
			Arsenic	3E-06		3E-07	- 1	3E-06	Skin, CVS	0.02		0.003	0.02
			Chromium VI	5E-07			1	5E-07	None Specified	0.001			0.001
			Cobalt						Thyroid	0.01			0.01
			1ron				- 1		GS	0.01	(		0.01
			Manganese				l i		CNS	0.007			0.007
			Chemical Total	3E-06		4E-07	[	4E-06	1	0.05		0.003	0.06
	1	Exposure Point Total		]				4E-06					0.06
	Exposure I	Medium Total						4E-06					0.06
	Air	PCB Removal Area	Benzo(a)anthracene	-	9E-15			9E-15	NA				
			Benzo(a)pyrene	l	1E-13			1E-13	NA				
			Benzo(b)fluoranthene		2E-14			2E-14	NA				
		1	Dibenzo(a,h)anthracene		3E-14			3E-14	NA NA				
	1	1	Aluminum	II					CNS		0.000006		0.000006
		1	Arsenic		9E-11			9E-11	Skin, CVS		0.000005		0.000005
		1	Chromium VI	l	9E-10		1	9E-10	Respiratory		0.0000004		0.0000004
		1	Cobalt		1E-10			1E-10	Respiratory		0.000006		0.000006
		1	Iron	1	!		l I		NA				(
	1	1	Manganese				l 1	**	CNS		0.00003		0.00003
	i		Chemical Total	<u> </u>	1E-09		[	1E-09	ĺ		0.00005		0.00005
	1	Exposure Point Total						1E-09					0.00005
	Exposure	Medium Total						1E-09			•		0.00005
Medium Total	<del></del>	<del></del>						4E-06					0.06

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.7.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	nogenic Hazard	Quotient	
		}	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Tota
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	7E-07		1E-06		2E-06		1			I
	1		Benzo(a)pyrene	6E-06		1E-05		2E-05					{
			Benzo(b)fluoranthene	9E-07		2E-06		3E-06					1
	1		Benzo(g,h,i)perylene										1
			Benzo(k)fluoranthene	3E-08		6E-08		9E-08	li .				1
	1		Chrysene	7E-09		1E-08	l i	2E-08					1
			Dibenzo(a,h)anthracene	1E-06		2E-06	l - i	3E-06					1
			Indeno(1,2,3-cd)pyrene	3E-07		5E-07	1 - 1	8E-07					1
			Total Aroclors	8E-08		1E-07		2E-07					1
			Arsenic	3E-06		1E-06		4E-06					1
		1	Cobalt										ì
			Iron										1
			Manganese				1						<u> </u>
			Chemical Total	1E-05	-	2E-05		3E-05					
		Exposure Point Total						3E-05					
	Exposure f	∕ledium Total						3E-05					
	Air	PCB Removal Area	Benzo(a)anthracene		9E-13		1	9E-13	li .	T			I
			Benzo(a)pyrene	j	8E-12			8E-12					1
			Benzo(b)fluoranthene	ll	1E-12		·-	1E-12					1
			Benzo(g,h,i)perylene	1									1
			Benzo(k)fluoranthene		4E-13		I I	4E-13					1
			Chrysene		9E-14			9E-14					1
			Dibenzo(a,h)anthracene		1E-12		l	1E-12					1
			Indeno(1,2,3-cd)pyrene		3E-13			3E-13	Į.				1
	1		Total Aroclors		2E-13			2E-13	1				1
	1		Arsenic	l	8E-11			8E-11	li .				1
	1		Cobalt		2E-10			2E-10	li .				1
	l		Iron							Ī			1
	1		Manganese				]		J.				
			Chemical Total		3E-10			3E-10					
	<u> </u>	Exposure Point Total						3Ē-10					I
	Exposure I	Medium Total		i i				3E-10					
edium Total								3E-05	V				1

# TABLE 9.7.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenzo(a,h)anthracene Aluminum Arsenic Chromium VI Cobalt Iron Manganese Chemical Total	2E-08 2E-07 4E-08 5E-08  5E-06 2E-06  		4E-08 4E-07 8E-08 1E-07  2E-06   2E-06		6E-08 6E-07 1E-07 2E-07  6E-06 2E-06   9E-06					
		Exposure Point Total						9E-06		· · · · · · · · · · · · · · · · · · ·			
		Medium Total		<u> </u>	T 28 . 1			9E-06		,			<u> </u>
	Air	PCB Removal Area	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenzo(a,h)anthracene Aluminum Arsenic Chromium VI Cobalt Iron Manganese Chemical Total		2E-14 3E-13 5E-14 8E-14  1E-10 2E-09 1E-10  3E-09			2E-14 3E-13 5E-14 8E-14  1E-10 2E-09 1E-10  3E-09					
		Exposure Point Total		<u> </u>				3E-09					<u> </u>
Medium Total	Exposure	Medium Total						3E-09 9E-06			<del></del>	<del></del>	<del> </del>

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	1E-06		1E-06		3E-06	NA				
			Benzo(a)pyrene	1E-05		1E-05		2E-05	NA NA				~-
			Benzo(b)fluoranthene	2E-06		2E-06		3E-06	NA NA				
			Benzo(g,h,i)perylene						Kidney	0.00007		0.00006	0.0001
	Į.	ĺ	Benzo(k)fluoranthene	6E-08		5E-08		1E-07	NA NA				
			Chrysene	1E-08		1E-08		3E-08	NA NA				}
			Dibenzo(a,h)anthracene	2E-06		2E-06		4E-06	NA NA				}
	1		Indeno(1,2,3-cd)pyrene	5E-07		5E-07		1E-06	NA NA				
			Total Aroclors	3E-07		3E-07		6E-07	NA NA				
			Arsenic	1E-05		2E-06		1E-05	Skin, CVS	0.07		0.01	0.09
			Cobalt	1					Thyroid	0.07		-	0.07
			Iron	]					GS	0.04			0.04
			Manganese						CNS	0.03		-	0.03
			Chemical Total	3E-05		2E-05		5E-05	]	0.2		0.01	0.2
		Exposure Point Total		]				5E-05_					0.2
	Exposure I	Medium Total		1				5E-05					0.2
	Air	PCB Removal Area	Benzo(a)anthracene		5E-12			5E-12	NA NA				
			Benzo(a)pyrene	1	4E-11			4E-11	NA NA				
	1		Benzo(b)fluoranthene		6E-12			6E-12	NA NA				
	1		Benzo(g,h,i)perylene						NA NA				
			Benzo(k)fluoranthene	l	2E-12	-		2E-12	NA NA				
	i		Chrysene		5E-13			5E-13	NA NA				
			Dibenzo(a,h)anthracene	J	7E-12			7E-12	NA NA				
			Indeno(1,2,3-cd)pyrene		2E-12		~~	2E-12	NA NA				
			Total Aroclors		2E-12			2E-12	NA NA				
			Arsenic		7E-10			7E-10	Skin, CVS		0.00003		0.00003
			Cobalt		2E-09			2E-09	Respiratory		0.00008	1	0.00008
			Iron						NA NA				
			Manganese	]					CNS		0.0003		0.0003
			Chemical Total	<u> </u>	2E-09			2E-09	]		0.0004	·-	0.0004
		Exposure Point Total		i	•			2E-09	]				0.0004
	Exposure	Medium Total						2E-09					0.0004
Medium Total				<del>i                                    </del>				5E-05	V				0.2

# TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	4E-08		3E-08		7E-08	NA				
i			Benzo(a)pyrene	4E-07		4E-07		8E-07	NA				
i			Benzo(b)fluoranthene	8E-08		7E-08		2E-07	NA				
1			Dibenzo(a,h)anthracene	1E-07		1E-07	1	2E-07	NA				
		1	Aluminum						CNS	0.02			0.02
			Arsenic	2E-05		4E-06	}	2E-05	Skin, CVS	0.1		0.02	0.1
	ļ		Chromium VI	3E-06				3E-06	None Specified	0.006			0.006
			Cobalt						Thyroid	0.06			0.06
	l		Iron						ĠS .	0.05			0.05
1	İ		Manganese						CNS	0.04			0.04
	i		Chemical Total	2E-05		4E-06	- 1	3E-05		0.3		0.02	0.3
	l	Exposure Point Total		1				3E-05					0.3
	Exposure I	Medium Total		ì				3E-05				•	0.3
	Air	PCB Removal Area	[Benzo(a)anthracene		1E-13		i i	1E-13	NA				
			Benzo(a)pyrene		1E-12			1E-12	NA				
		1	Benzo(b)fluoranthene		3E-13		1 1	3E-13	NA				
		1	Dibenzo(a,h)anthracene		4E-13		[	4E-13	NA				
			Aluminum						CNS		0.00007		0.00007
		1	Arsenic		1E-09			1E-09	Skin, CVS		0.00005		0.00005
l		i	Chromium VI	l	1E-08			1E-08	Respiratory		0.000004		0.000004
			Cobalt	l	1E-09		(	1E-09	Respiratory		0.00006		0.00006
		1	Iron				1		NA				
1	1		Manganese						CNS		0.0004		0.0004
i			Chemical Total		1É-08		(	1E-08	]		0.0005		0.0005
	1	Exposure Point Total		i				1E-08		•			0.0005
	Exposure I	Medium Total			•			1E-08				•	0.0005
Medium Total				T				3E-05					0.3

Notes:

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	1E-07		4E-08		1E-07	NA				
1			Benzo(a)pyrene	9E-07		3E-07		1E-06	NA NA				
#			Benzo(b)fluoranthene	1E-07		5E-08		2E-07	NA				
			Benzo(g,h,i)perylene	ll					Kidney	0.0001		0.00005	0.0002
1	1	1	Benzo(k)fluoranthene	4E-09		2E-09		6E-09	NA NA				
1		1	Chrysene	1E-09		4E-10		1E-09	NA NA				
li		1	Dibenzo(a,h)anthracene	1E-07		6E-08		2E-07	NA NA				
1		1	Indeno(1,2,3-cd)pyrene	4E-08		1E-08		5E-08	NA NA				
<b>I</b>		1	Total Aroclors	2E-08		8E-09	-	3E-08	NA NA				
1			Arsenic	8E-07		7E-08		9E-07	Skin, CVS	0.1		0.01	0.1
íl .		1	Cobalt				- I		Thyroid	0.01			0.01
1		1	Iron						GS	0.08	i		0.08
il .		1	Manganese						CNS	0.04			0.04
il .			Chemical Total	2E-06		5E-07		2Ē-06		0.2		0.01	0.2
1		Exposure Point Total		]				2E-06					0.2
1	Exposure N	Medium Total		T				2E-06					0.2
11	Air	PCB Removal Area	Benzo(a)anthracene		8E-10			8E-10	NA NA				
1		1	Benzo(a)pyrene	ll	7E-09		1	7E-09	NA				
1			Benzo(b)fluoranthene	ii	1E-09			1E-09	NA NA				
il .			Benzo(g,h,i)perylene	i			- 1		NA NA				
ii			Benzo(k)fluoranthene	ll	3E-10			3E-10	NA NA		**		
1			Chrysene		7E-11			7E-11	NA				
1	]		Dibenzo(a,h)anthracene	1	1E-09			1E-09	NA NA				
11	1		Indeno(1,2,3-cd)pyrene	il	3E-10			3E-10	NA				
1			Total Aroclors		3E-10			3E-10	NA NA				
#			Arsenic		1E-07			1E-07	Skin, CVS		0.1		0.1
1	1	1	Cobalt	ll	2E-07			2E-07	Respiratory		0.1		0.1
A	1	1	Iron	]					NA				
11	1	1	Manganese				1		CNS		1		11
11		1	Chemical Total		3E-07			3E-07	[		1		1
il .		Exposure Point Total		1			1	3E-07					1
1	Exposure	Medium Total		i				3E-07					11
Medium Total	Едродата т			₩				2E-06					

## TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk		Non-Carcinogenic Hazard Quotient				
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	3E-09		1E-09		4E-09	NA				
			Benzo(a)pyrene	3E-08		1E-08		4E-08	NA				
			Benzo(b)fluoranthene	6E-09		2E-09		8E-09	NA NA				
	i		Dibenzo(a,h)anthracene	8E-09		3E-09		1E-08	NA.				
			Aluminum	1				* *	CNS	0.03			0.03
	1		Arsenic	1E-06		1E-07		1E-06	Skin, CVS	0.2		0.02	0.2
			Chromium VI	2E-07				2E-07	None Specified				
		1	Cobalt				- '		Thyroid	0.01			0.01
			Iron						GS	0.09			0.09
		1	Manganese				I L		CNS	0.06			0.06
			Chemical Total	1E-06		1E-07	[	1E-06	İ	0.4		0.02	0.4
	1	Exposure Point Total						1E-06					0.4
	Exposure	Exposure Medium Total			1E-06								
	Air	PCB Removal Area	Benzo(a)anthracene		2E-11			2E-11	NA NA				
			Benzo(a)pyrene	I	2E-10			2E-10	NA				
			Benzo(b)fluoranthene		4E-11			4E-11	NA				
			Dibenzo(a,h)anthracene		6E-11	+-		6E-11	NA NA				
			Aluminum						CNS		0.3		0.3
			Arsenic	1	2E-07			2E-07	Skin, CVS		0.2		0.2
			Chromium VI	1	2E-06			2E-06	Respiratory		0.02		0.02
			Cobalt	l	2E-07			2E-07	Respiratory		0.08		0.08
	1		Iron						NA				
			Manganese				l 1		CNS		1		11
			Chemical Total		2E-06		1 [[	2E-06	[		2		2
		Exposure Point Total						2E-06					2
	Exposure	Medium Total						2E-06					2
Medium Total				7				3E-06					2

Notes:

Target Organ I	II - Subsurface So
Total CNS HI	1
Total CVS HI	_0.4
Total GS HI	0.1
Total Respiratory HI	0.1
Total Skin HI	0.4
Total Thyroid HI	0.01

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-LIfe Exposure to Carcinogens (2005).

#### TABLE 9.10.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern			Carcinogenie	Risk		Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	2E-05		9E-06	1	3E-05	NA				
i	ı		Benzo(a)pyrene	2E-04		8E-05		3E-04	NA		]		
	1		Benzo(b)fluoranthene	3E-05		1E-05	l i	4E-05	NA				
	1		Benzo(g,h,i)perylene				I 1		Kidney	0.0009		0.0003	0.001
	1		Benzo(k)fluoranthene	1E-06	'	4E-07	l }	1E-06	NA		-		}
	i		Chrysene	2E-07		9E-08	- [	3E-07	NA				
			Dibenzo(a,h)anthracene	3E-05		1E-05	[	5E-05	NA				
ı			Indeno(1,2,3-cd)pyrene	9E-06		3E-06	- 1	1E-05	NA		]		
			Total Aroclors	9E-07		4E-07		1E-06	NA				
	i		Arsenic	4E-05		3E-06		4E-05	Skin, CVS	0.9		0.08	1
	1		Cobalt						Thyroid	1.0			1.0
	1		Iron	i					GS	0.6			0.6
		i	Manganese				1 1		CNS	0.3			0.3
	į.		Chemical Total	3E-04		1E-04	1	5E-04		3		0.08	3
	L	Exposure Point Total					<u> j</u> i	5E-04					3
	Exposure N	Medium Total			<del></del>			5E-04					3
	Air	PCB Removal Area	Benzo(a)anthracene		3E-11			3E-11	NA				
			Benzo(a)pyrene		2E-10			2E-10	NA				
	1		Benzo(b)fluoranthene		3E-11			3E-11	NA NA				
	1		Benzo(g,h,i)perylene						NA				
	1		Benzo(k)fluoranthene		1E-11		l I	1E-11	NA NA				
			Chrysene		2E-12			2E-12	NA NA				
	1		Dibenzo(a,h)anthracene		4E-11			4E-11	NA NA				
	ŀ	l .	Indeno(1,2,3-cd)pyrene		9E-12			9E-12	NA NA				
		!	Total Aroclors		2E-12		!	2E-12	NA				
		1	Arsenic		7E-10			7E-10	Skin, CVS		0.0001		0.0001
		1	Cobalt		2E-09			2E-09	Respiratory		0.0003		0.0003
		Į.	Iron						NA NA				
			Manganese						CNS		0.001		0.001
			Chemical Total		3E-09			3E-09	1		0.002		0.002
		Exposure Point Total	•				•	3E-09					0.002
	Exposure N	Medium Total						3E-09					0.002
Medium Total								5E-04			_		3

## TABLE 9.10.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	c Risk		Non-Carcinogenic Hazard Quotient				
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Tota
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	6E-07		2E-07		8E-07	NA NA			'	
	•		Benzo(a)pyrene	7E-06		3E-06		1E-05	NA NA				
	ŀ		Benzo(b)fluoranthene	1E-06		5E-07		2E-06	NA NA				
	ı		Dibenzo(a,h)anthracene	2E-06		7E-07		3E-06	NA NA				
	<u> </u>		Aluminum	l					CNS	0.2			0.2
			Arsenic	6E-05		5E-06		6E-05	Skin, CVS	1		0.1	2
	1		Chromium VI	6E-05				6E-05	None Specified	0.08			0.08
	i		Cobalt						Thyroid	0.8			0.8
			Iron	1				* *	GS	0.7			0.7
			Manganese				1 - L		CNS	0.5			0.5
			Chemical Total	1E-04		9E-06	[	1E-04		4		0.1	4
		Exposure Point Total		3				1E-04					4
	Exposure	Exposure Medium Total						1E-04					4
	Air	PCB Removal Area	Benzo(a)anthracene		6E-13			6E-13	NA				
			Benzo(a)pyrene		7E-12			7E-12	NA				
			Benzo(b)fluoranthene	1	1E-12			1E-12	NA NA				
			Dibenzo(a,h)anthracene		2E-12			2E-12	NA				
			Aluminum	1					CNS		0.0003		0.0003
	i		Arsenic		1E-09			1E-09	Skin, CVS		0.0002		0.0002
	1		Chromium VI	<b>I</b>	6E-08			6E-08	Respiratory		0.00002		0.00002
			Cobalt		1E-09			1E-09	Respiratory		0.0003		0.0003
	l l		Iron						NA				
		1	Manganese	_ii			lL		CNS		0.002		0.002
			Chemical Total		7E-08		[	7E-08			0.002		0,002
	1	Exposure Point Total		<u> </u>				7E-08					0.002
	Exposure	Medium Total						7E-08					0.002
edium Total				1				1E-04					4

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

	Tai	rget Organ His	
Surface S	oil	Subsu	ırface Soil
Total CNS HI	0.3	Total CNS HI	0.7
Total CVS HI	1	Total CVS HI	2
Total GS HI	0.6	Total GS HI	0.7
Total Kidney HI	0.001	Total Respiratory HI	0.0003
Fotal Respiratory Hi	0.0003	Total None Specified HI	0.08
Total Skin HI	1	Total Skin HI	2
Total Thyroid HI	1	Total Thyroid HI	0.8

# TABLE 9.11.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	4E-06		2E-06		5E-06	NA				
			Benzo(a)pyrene	3E-05		2E-05	}	5E-05	NA				
		İ	Benzo(b)fluoranthene	4E-06		2E-06	ļ	7E-06	NA NA				
	!		Benzo(g,h,i)perylene	l					Kidney	0.00009		0.00005	0.0001
	1		Benzo(k)fluoranthene	2E-07		8E-08	1	2E-07	NA				
			Chrysene	4E-08		2E-08	l	5E-08	NA				
			Dibenzo(a,h)anthracene	5E-06		3E-06		8E-06	NA				
			Indeno(1,2,3-cd)pyrene	1E-06		7E-07		2E-06	NA				}
			Total Aroclors	4E-07		2E-07		6E-07	NA				)
			Arsenic	2E-05		2E-06		2E-05	Skin, CVS	0.10		0.01	0.1
			Cobalt						Thyroid	0.1			0.1
			Iron						GS	0.06			0.06
			Manganese				l I		CNS	0.04			0.04
			Chemical Total	6E-05		3E-05		9E-05		0.3		0.01	0.3
		Exposure Point Total		1				9É-05					0.3
	Exposure	Exposure Medium Total			9E-05								0.3
	Air	PCB Removal Area	Benzo(a)anthracene	i	3E-11		1	3E-11	NA				
	1		Benzo(a)pyrene	i	3E-10		l i	3E-10	NA				
			Benzo(b)fluoranthene		4E-11			4E-11	NA				
	l		Benzo(g,h,i)perylene						NA				i
	l		Benzo(k)fluoranthene		1E-11			1E-11	NA		i		}
			Chrysene		3E-12			3E-12	NA		i		
	ı		Dibenzo(a,h)anthracene		5E-11		1 1	5E-11	NA NA		i		
	ı		Indeno(1,2,3-cd)pyrene		1E-11			1E-11	NA				
	ŀ		Total Aroclors		7E-12			7E-12	NA		ì		
	l	İ	Arsenic		3E-09			3E-09	Skin, CVS		0.0001		0.0001
			Cobalt		6E-09			6E-09	Respiratory		0.0003		0.0003
	ŀ		Iron				-		NA				}
			Manganese				1 1		CNS		0.001		0.001
			Chemical Total		9E-09		1	9E-09			0.002		0.002
	1	Exposure Point Total		l				9E-09					0.002
	Exposure	Medium Total						9E-09					0.002
Medium Total				r———				9E-05					0.3

## TABLE 9.11.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk		Non-Carcinogenic Hazard Quotient				
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	9E-08		5E-08		1E-07	NA				
			Benzo(a)pyrene	1E-06		5E-07		2E-06	NA				
			Benzo(b)fluoranthene	2E-07		1E-07		3E-07	NA NA				
			Dibenzo(a,h)anthracene	3E-07		1E-07		4E-07	NA				
			Aluminum	B					CNS	0.02			0.02
			Arsenic	2E-05		3E-06	l I	3E-05	Skin, CVS	0.2		0.02	0.2
			Chromium VI	8E-06			l	8E-06	None Specified	0.009			0.009
			Cobalt				l I		Thyroid	0.09			0.09
			Iron	1			I I		GS	0.07			0.07
			Manganese				l L		CNS	0.05			0.05
			Chemical Total	3E-05		4E-06	[	4E-05		0.4		0.02	0.4
		Exposure Point Total	•	1				4E-05					0.4
	Exposure	Exposure Medium Total			4E-05								Õ.4
	Air	PCB Removal Area	Benzo(a)anthracene		9E-13		1	9E-13	NA NA				
			Benzo(a)pyrene		1E-11			1E-11	NA				
			Benzo(b)fluoranthene		2E-12			2E-12	NA				
			Dibenzo(a,h)anthracene		3E-12		I I	3E-12	NA				{
			Aluminum						CNS		0.0003		0.0003
		l .	Arsenic		4E-09			4E-09	Skin, CVS		0.0002		0.0002
		1	Chromium VI	i	9E-08			9E-08	Respiratory		0.00002		0.00002
		ji	Cobalt		5E-09		f	5E-09	Respiratory		0.0003		0.0003
		H	Iron						NA '		i I		
	1	ŀ	Manganese				-		CNS		0.002		0.002
			Chemical Total		1E-07		- 1	1E-07	1		0.002		0.002
		Exposure Point Total						1E-07					0.002
	Exposure N	Medium Total						1E-07				•	0.002
Medium Total								4E-05					0.4

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

**APPENDIX F.3** 

**PROUCL OUTPUTS** 

**North Waterfront** 

**Unpaved Surface Soil** 

#### PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

User Selected Options From File C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Unpaved Surface S Full Precision OFF Confidence Coefficient 95% Number of Bootstrap Operations 2000  BENZO(A)ANTHRACENE  General Statistics Number of Valid Data 8 Number of Detected Data	iil - North W
Full Precision OFF Confidence Coefficient 95% Number of Bootstrap Operations 2000  BENZO(A)ANTHRACENE  General Statistics	il - North W
Confidence Coefficient 95% Number of Bootstrap Operations 2000  BENZO(A)ANTHRACENE  General Statistics	
Number of Bootstrap Operations 2000  BENZO(A)ANTHRACENE  General Statistics	
BENZO(A)ANTHRACENE  General Statistics	
General Statistics	
General Statistics	
Number of Valid Data   8   Number of Detected Data	
	2
Number of Distinct Detected Data 2 Number of Non-Detect Data Percent Non-Detects	75.00%
Raw Statistics Log-transformed Statistics	
Minimum Detected 31.8 Minimum Detected	3.459
Maximum Detected 232 Maximum Detected	5.447
Mean of Detected131.9Mean of DetectedSD of Detected141.6SD of Detected	4.453 1.405
SD of Detected 141.6 SD of Detected Minimum Non-Detect 330 Minimum Non-Detect	5.799
Maximum Non-Detect 410 Maximum Non-Detect	6.016
Note: Data have multiple DLs - Use of KM Method is recommended  Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),  Number treated as Detected	0
Observations < Largest ND are treated as NDs Single DL Non-Detect Percentage	100.00%
Warning: Data set has only 2 Distinct Detected Values.	
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.	
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.  Those methods will return a 'N/A' value on your output display!  It is necessary to have 4 or more Distinct Values for bootstrap methods.	
However, results obtained using 4 to 9 distinct values may not be reliable.	
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.	
UCL Statistics  Normal Distribution Test with Detected Values Only  Lognormal Distribution Test with Detected Values O	
Shapiro Wilk Test Statistic N/A Shapiro Wilk Test Statistic	h
Oriapilo Wilk Test Otatistic 1974   Oriapilo Wilk Test Otatistic	
	N/A
5% Shapiro Wilk Critical Value N/A 5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level Data not Lognormal at 5% Significance Level	
5% Shapiro Wilk Critical Value N/A 5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level Data not Lognormal at 5% Significance Level	N/A
5% Shapiro Wilk Critical Value N/A 5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level Data not Lognormal at 5% Significance Level  Assuming Normal Distribution Assuming Lognormal Distribution	N/A
5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level  Data not Lognormal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  DL/2 Substitution Method	N/A N/A
5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level  Data not Lognormal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  N/A  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  165.5	N/A N/A 4.992
5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level  Data not Lognormal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean 165.5  SD 58.71  DATA not Lognormal at 5% Significance Level  Data not Lognormal at 5% Significance Level  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean SD 58.71	N/A N/A 4.992 0.63
5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level  Data not Lognormal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  N/A  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  165.5	N/A N/A 4.992 0.63
5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level  Data not Lognormal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  58.71  SD  95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method  N/A  Log ROS Method	N/A N/A 4.992 0.63 333
5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method  MILE method failed to converge properly  N/A  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  DL/2 Substitution Method  Mean  165.5  Mean  SD  95% DL/2 (t) UCL  204.8  N/A  Log ROS Method  MLE method failed to converge properly	N/A N/A 4.992 0.63 333
5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  165.5  Mean  SD  58.71  SD  95% DL/2 (t) UCL  204.8  Maximum Likelihood Estimate(MLE) Method  MLE method failed to converge properly  Mean in Log Scale  SD  SD  SD  SD  Mean in Log Scale	N/A N/A 4.992 0.63 333 N/A N/A
5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  58 Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  165.5  Mean  SD  58.71  SD  95% DL/2 (t) UCL  204.8  Maximum Likelihood Estimate(MLE) Method  MLE method failed to converge properly  Mean in Log Scale  SD in Log Scale  Mean in Original Scale	N/A N/A 4.992 0.63 333 N/A N/A N/A
5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  165.5  Mean  SD  58.71  SD  95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method  MLE method failed to converge properly  Mean in Log Scale  Mean in Original Scale  SD in Original Scale	N/A N/A 4.992 0.63 333 N/A N/A N/A
5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 58.71 Maximum Likelihood Estimate(MLE) Method MLE method failed to converge properly  Mean in Original Scale SD SD Mean SD SD SD Mean SD SD Mean SD SD SD Mean SD SD SD SD SD SD SD SD SD SD SD SD SD	N/A N/A N/A 4.992 0.63 333 N/A N/A N/A N/A
5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  165.5  Mean  SD  58.71  SD  95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method  MLE method failed to converge properly  Mean in Log Scale  Mean in Original Scale  SD in Original Scale	N/A N/A 4.992 0.63 333 N/A N/A N/A

#### PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

BENZO(A)ANTHRACENE (Continued)					
Gamma Distribution Test with Detected Values Only	,	Data Distribution Test with Detected Values Only			
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)			
Theta Star	N/A				
nu star	N/A				
A-D Test Statistic	N/A	Nonparametric Statistics			
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method			
K-S Test Statistic	N/A	Mean	131.9		
5% K-S Critical Value	71717 G. M. G. G. G. G. G. G. G. G. G. G. G. G. G.				
Data not Gamma Distributed at 5% Significance Leve	el	SE of Mean	100.1		
		95% KM (t) UCL	321.5		
Assuming Gamma Distribution		95% KM (z) UCL	296.5		
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	382.8		
Minimum	N/A	95% KM (bootstrap t) UCL	N/A		
Maximum	N/A	95% KM (BCA) UCL	232		
Mean	N/A	95% KM (Percentile Bootstrap) UCL	232		
Median	N/A	95% KM (Chebyshev) UCL	568.2		
SD	N/A	97.5% KM (Chebyshev) UCL	757		
k star	N/A	99% KM (Chebyshev) UCL	1128		
Theta star	N/A				
Nu star	N/A	Potential UCLs to Use			
AppChi2	N/A	95% KM (BCA) UCL	232		
95% Gamma Approximate UCL (Use when n >= 40)	N/A				
95% Adjusted Gamma UCL (Use when n < 40)	N/A				
ote: DL/2 is not a recommended method.					
Note: Suggestions regarding the selection of a 95%	UCL are pro	ovided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the result	s of the sim	ulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight	, the user m	nay want to consult a statistician.			

BENZO(A)PYRENE			
	General Stati	lation	
Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	
Transcr of Biodinet Beteeted Bata		Percent Non-Detects	75.00%
		1 Ground Toll Bolook	70.007
Raw Statistics		Log-transformed Statistics	
Minimum Detected	29.6	Minimum Detected	3.38
Maximum Detected	165	Maximum Detected	5.10
Mean of Detected	97.3	Mean of Detected	4.24
SD of Detected	95.74	SD of Detected	1.21
Minimum Non-Detect	330	Minimum Non-Detect	5.79
Maximum Non-Detect	410	Maximum Non-Detect	6.01
Note: Data have multiple DLs - Use of KM Method is recommend	ded	Number treated as Non-Detect	
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.009
Worning: Data a	ot has only 2 Di	estinat Datastad Values	
		stinct Detected Values.  Ingful and reliable test statistics and estimates.	
		s to estimate environmental parameters (e.g., EPC, BTV).	
The Project realitinay decide to use alternative sit	e specific value	s to estimate environmental parameters (e.g., EFO, DTV).	
Unless Data Quality Objectives (DQOs) h	ave been met. i	it is suggested to collect additional observations.	
cinco bala dalily objectives (base)			
The number of detected data may not be ade	equate enough t	o perform GOF tests, bootstrap, and ROS methods.	
		o perform GOF tests, bootstrap, and ROS methods.	
Those methods will	return a 'N/A' va		
Those methods will  It is necessary to have 4 However, results obtained	or more Distinct dusing 4 to 9 dis	alue on your output display!  It Values for bootstrap methods.  stinct values may not be reliable.	
Those methods will  It is necessary to have 4 However, results obtained	or more Distinct dusing 4 to 9 dis	alue on your output display!  It Values for bootstrap methods.	
Those methods will  It is necessary to have 4 However, results obtained	or more Distinct dusing 4 to 9 dis	alue on your output display!  It Values for bootstrap methods.  stinct values may not be reliable.	
Those methods will  It is necessary to have 4 However, results obtained	return a 'N/A' va or more Distinc d using 4 to 9 die e observations f	alue on your output display!  It Values for bootstrap methods.  It values for bootstrap methods.  It values for bootstrap methods.  It values for bootstrap methods.  It values for bootstrap methods.  It values for bootstrap methods.  It values for bootstrap methods.	
Those methods will  It is necessary to have 4  However, results obtained  It is recommended to have 10 to 15 or more	or more Distinct dusing 4 to 9 dis	alue on your output display!  It Values for bootstrap methods.  Istinct values may not be reliable.  If or accurate and meaningful results and estimates.	
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only	or more Distinct d using 4 to 9 dise observations for UCL Statist	alue on your output display!  It Values for bootstrap methods.  Istinct values may not be reliable.  Ior accurate and meaningful results and estimates.  Itics  Lognormal Distribution Test with Detected Values Only	•
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	or more Distinct dusing 4 to 9 dise observations for UCL Statist	alue on your output display!  It Values for bootstrap methods. It values may not be reliable. It values may not be reliable. It values and meaningful results and estimates.  It ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	or more Distinct d using 4 to 9 dise observations for UCL Statist	alue on your output display!  It Values for bootstrap methods. It values may not be reliable. It values may not be reliable. It values and meaningful results and estimates.  It ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	•
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	or more Distinct dusing 4 to 9 dise observations for UCL Statist	alue on your output display!  It Values for bootstrap methods. It values may not be reliable. It values may not be reliable. It values and meaningful results and estimates.  It ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	or more Distinct dusing 4 to 9 dise observations for UCL Statist	alue on your output display!  It Values for bootstrap methods. It values may not be reliable. It values may not be reliable. It values and meaningful results and estimates.  It ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	or more Distinct dusing 4 to 9 dise observations for UCL Statist	alue on your output display!  It Values for bootstrap methods. It values may not be reliable. It values may not be reliable. It values and meaningful results and estimates.  It ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	or more Distinct dusing 4 to 9 dise observations for UCL Statist	alue on your output display!  It Values for bootstrap methods. It values may not be reliable. It values may not be reliable. It values and meaningful results and estimates.  It ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	or more Distinct dusing 4 to 9 dise observations for UCL Statist N/A N/A N/A 156.8	alue on your output display!  It Values for bootstrap methods. It values may not be reliable. It values may not be reliable. It values and meaningful results and estimates.  It values be reliable. It values and meaningful results and estimates.  It values only Shapiro Wilk Test Statistic 5% Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	N/A N/A 4.94
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	or more Distinct dusing 4 to 9 dise observations for UCL Statist	alue on your output display!  It Values for bootstrap methods. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values on the values on the values on the values on the value of value of the value of the value of the value of va	N/A N/A N/A 4.94 0.63
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	or more Distinct dusing 4 to 9 dise observations for M/A N/A N/A N/A N/A 156.8 53.05	alue on your output display!  It Values for bootstrap methods. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values and estimates.  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	N/A N/A N/A 4.94 0.63
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dise observations for M/A N/A N/A N/A N/A 156.8 53.05	Assuming Lognormal Distribution  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method	N/A N/A N/A 4.9- 0.63 31
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	or more Distinct dusing 4 to 9 dise observations for M/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale	N/A N/A N/A 4.9- 0.63 31
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dise observations for M/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Log Scale  SD in Log Scale	N/A N/A 1.9 0.63 31 N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dise observations for M/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N	Assuming Lognormal Distribution  Data not Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Coriginal Scale  Mean in Coriginal Scale	N/A N/A 1.9 0.63 31 N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dise observations for M/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N	Assuming Lognormal Distribution  Data not Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Coriginal Scale  SD in Original Scale  SD in Original Scale	N/A N/A N/A 4.9 0.63 31 N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dise observations for M/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N	Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale  SD in Original Scale  95% t UCL	N/A N/A N/A 4.9- 0.63 31 N/A N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dise observations for M/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N	Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  95% t UCL  95% Percentile Bootstrap Ucb	N/A N/A N/A 0.63 31 N/A N/A N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dise observations for M/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N	Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale  SD in Original Scale  95% t UCL	N/A N/A N/A 4.94 0.631 317 N/A N/A N/A N/A

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A	· · · · · · · · · · · · · · · · · · ·	
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Test Statistic	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	97.3
5% K-S Critical Value	N/A	SD SD	67.7
Data not Gamma Distributed at 5% Significance Level		SE of Mean	67.7
Data not Gamma Distributed at 5% Significance Level	I	95% KM (t) UCL	225.6
Assuming Gamma Distribution		95% KM (z) UCL	208.7
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	265.7
Minimum	N/A	95% KM (bootstrap t) UCL	198.9
Maximum	N/A	95% KM (BCA) UCL	165
Mean	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Median	N/A	95% KM (Chebyshev) UCL	392.4
SD	N/A	97.5% KM (Chebyshev) UCL	520.1
k star	N/A	99% KM (Chebyshev) UCL	770.9
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (BCA) UCL	165
95% Gamma Approximate UCL (Use when n >= 40)	N/A	, ,	
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
DL/2 is not a recommended method.			
		vided to help the user to select the most appropriate 95% UCL.	
These recommendations are based upon the results	of the simu	ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight,	the user ma	ay want to consult a statistician.	

BENZO(B)FLUORANTHENE			
N 1 0/ 5/2	General Stat		
Number of Valid Data  Number of Distinct Detected Data	8	Number of Detected Data	2
Number of distinct detected data	2	Number of Non-Detect Data Percent Non-Detects	75.00%
		Percent Non-Detects	75.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	54	Minimum Detected	3.989
Maximum Detected	263	Maximum Detected	5.57
Mean of Detected	158.5	Mean of Detected	4.78
SD of Detected	147.8	SD of Detected	1.11
Minimum Non-Detect	330	Minimum Non-Detect	5.79
Maximum Non-Detect	410	Maximum Non-Detect	6.01
Note: Data have multiple DLs - Use of KM Method is recommend	ded	Number treated as Non-Detect	
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	100.000
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.009
Warning: Data s	et has only 2 D	sistinct Detected Values.	
		ngful and reliable test statistics and estimates.	
		es to estimate environmental parameters (e.g., EPC, BTV).	
The Frejoc Foam may accide to dee attendance of	o opodino raide	so to obtaine on vironmontal paramotoro (o.g., Er o, Dr v).	
Unless Data Quality Objectives (DQOs) h	ave been met.	it is suggested to collect additional observations.	
The number of detected data may not be ade	equate enough	to perform GOF tests, bootstrap, and ROS methods	
		to portorni dor tooto, boototiap, ana rioo motilodo.	
Those methods will		alue on your output display!	
Those methods will			
It is necessary to have 4	return a 'N/A' v	alue on your output display! ct Values for bootstrap methods.	
It is necessary to have 4 However, results obtained	return a 'N/A' v or more Distind d using 4 to 9 d	ct Values for bootstrap methods. istinct values may not be reliable.	
It is necessary to have 4 However, results obtained	return a 'N/A' v or more Distind d using 4 to 9 d	alue on your output display! ct Values for bootstrap methods.	
It is necessary to have 4 However, results obtained	return a 'N/A' v or more Distind d using 4 to 9 d	ct Values for bootstrap methods. istinct values may not be reliable.	
It is necessary to have 4 However, results obtained	return a 'N/A' v or more Distind d using 4 to 9 d e observations	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.	
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more	return a 'N/A' v or more Distind d using 4 to 9 d	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.	
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more Normal Distribution Test with Detected Values Only	or more Distinct d using 4 to 9 d e observations UCL Statis	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics Lognormal Distribution Test with Detected Values Onl	•
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	or more Distinct dusing 4 to 9 de observations  UCL Statis	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	or more Distinct d using 4 to 9 d e observations UCL Statis	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	•
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	or more Distinct dusing 4 to 9 de observations  UCL Statis	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	or more Distinct dusing 4 to 9 de observations  UCL Statis	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	or more Distinct dusing 4 to 9 de observations  UCL Statis	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution	or more Distinct dusing 4 to 9 de observations  UCL Statis	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	or more Distinct dusing 4 to 9 de observations  UCL Statis  N/A  N/A  172.1  57.84	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	N/A N/A 5.074 0.468
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	or more Distinct dusing 4 to 9 de observations  UCL Statis  N/A  N/A  172.1	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean	N/A N/A 5.074 0.468
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	or more Distinct dusing 4 to 9 de observations  UCL Statis  N/A  N/A  172.1  57.84  210.9	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	N/A N/A 5.074 0.468
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 de observations  UCL Statis  N/A  N/A  172.1  57.84	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	N/A N/A N/A 5.07- 0.46- 266.
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	or more Distinct dusing 4 to 9 de observations  UCL Statis  N/A  N/A  172.1  57.84  210.9	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	N/A N/A N/A 5.07- 0.463 266.4
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 de observations  UCL Statis  N/A  N/A  172.1  57.84  210.9	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	5.07 0.46 266.
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 de observations  UCL Statis  N/A  N/A  172.1  57.84  210.9	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	5.07 0.46 266. N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 de observations  UCL Statis  N/A  N/A  172.1  57.84  210.9	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	5.07 0.46 266. N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 de observations  UCL Statis  N/A  N/A  172.1  57.84  210.9	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale SD in Original Scale	5.07- 0.46- 266. N/A N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 de observations  UCL Statis  N/A  N/A  172.1  57.84  210.9	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL 95% Percentile Bootstrap UCL	5.074 0.465 266.6 N/A N/A N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 de observations  UCL Statis  N/A  N/A  172.1  57.84  210.9	ct Values for bootstrap methods. istinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale SD in Original Scale	5.074 0.465 266.6 N/A N/A N/A N/A

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	158.
5% K-S Critical Value	N/A	SD	104.
Data not Gamma Distributed at 5% Significance Leve	ı	SE of Mean	104.
		95% KM (t) UCL	356.
Assuming Gamma Distribution		95% KM (z) UCL	330.4
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	420.4
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	26
Mean	N/A	95% KM (Percentile Bootstrap) UCL	26
Median	N/A	95% KM (Chebyshev) UCL	614
SD	N/A	97.5% KM (Chebyshev) UCL	811.
k star	N/A	99% KM (Chebyshev) UCL	1198
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (BCA) UCL	263
95% Gamma Approximate UCL (Use when n >= 40)	N/A		
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
DL/2 is not a recommended method.			
		vided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight,	the user ma	ay want to consult a statistician.	

CHRYSENE			
	0	Cat.	
Number of Valid Data	General Stati	Number of Detected Data	
Number of Valid Data  Number of Distinct Detected Data	8 2	Number of Non-Detect Data	2
Number of distinct detected data	2	Percent Non-Detects	75.00%
		i ercent Non-Detects	75.0070
Raw Statistics		Log-transformed Statistics	
Minimum Detected	39.8	Minimum Detected	3.684
Maximum Detected	238	Maximum Detected	5.472
Mean of Detected	138.9	Mean of Detected	4.578
SD of Detected	140.1	SD of Detected	1.26
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	410	Maximum Non-Detect	6.016
lata. Data have goodkinta Dha illan af I/M Mathaulia waxayaya	4-4	Noveles to start as New Date of	
Note: Data have multiple DLs - Use of KM Method is recommend	ded	Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	100.00%
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: Data s	et has only 2 Di	istinct Detected Values.	
		ngful and reliable test statistics and estimates.	
		es to estimate environmental parameters (e.g., EPC, BTV).	
•	•	1 , , , ,	
Unless Data Quality Objectives (DQOs) h	ave been met, i	it is suggested to collect additional observations.	
		to perform GOF tests, bootstrap, and ROS methods.	
Those methods will	roturn a 'NI/A' ve		
THOSE MELIOUS WIII	icuilla IVA V	alue on your output display!	
		, , ,	
It is necessary to have 4	or more Distinc	ct Values for bootstrap methods.	
It is necessary to have 4 However, results obtained	or more Distinc	ct Values for bootstrap methods. stinct values may not be reliable.	
It is necessary to have 4 However, results obtained	or more Distinc	ct Values for bootstrap methods.	
It is necessary to have 4 However, results obtained	or more Distinc	ct Values for bootstrap methods. stinct values may not be reliable.	
It is necessary to have 4 However, results obtained	or more Distinc	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.	
It is necessary to have 4 However, results obtained	or more Distino d using 4 to 9 die observations f	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates. tics Lognormal Distribution Test with Detected Values Only	у
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more	or more Distino d using 4 to 9 die observations f	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	y N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	or more Distinct d using 4 to 9 dis e observations f	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	or more Distinct dusing 4 to 9 dispersations for UCL Statist	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	or more Distinct dusing 4 to 9 dispersations for UCL Statist	ct Values for bootstrap methods. Istinct values may not be reliable. Istor accurate and meaningful results and estimates.  Itics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution	or more Distinct dusing 4 to 9 dispersations for UCL Statist	ct Values for bootstrap methods. Istinct values may not be reliable. Istor accurate and meaningful results and estimates.  Itics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	or more Distinct dusing 4 to 9 die observations f	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	or more Distinct dusing 4 to 9 dispersions for the observation for the observations for the observations for the o	ct Values for bootstrap methods. Istinct values may not be reliable. Istor accurate and meaningful results and estimates.  Itics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean	N/A N/A 5.023
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	or more Distinct dusing 4 to 9 dispersions of UCL Statist N/A N/A N/A 167.2 57.15	ct Values for bootstrap methods. Istinct values may not be reliable. Istor accurate and meaningful results and estimates.  Itics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	N/A N/A 5.023 0.558
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	or more Distinct dusing 4 to 9 dispersions for the observation for the observations for the observations for the o	ct Values for bootstrap methods. Istinct values may not be reliable. Istor accurate and meaningful results and estimates.  Itics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean	N/A N/A 5.023 0.558
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	or more Distinct dusing 4 to 9 dispersations for the observations for th	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	N/A N/A 5.023 0.555
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dispersions of UCL Statist N/A N/A N/A 167.2 57.15	ct Values for bootstrap methods. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values only Shapiro Wilk Test Statistic 5% Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value In Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method	N/A N/A N/A 5.023 0.555 296.5
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	or more Distinct dusing 4 to 9 dispersations for the observations for th	ct Values for bootstrap methods. Istinct values may not be reliable. For accurate and meaningful results and estimates.  Itics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	N/A N/A N/A 5.023 0.555 296.5
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dispersations for the observations for th	ct Values for bootstrap methods. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values only Shapiro Wilk Test Statistic 5% Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	5.023 0.555 296.5
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dispersations for the observations for th	ct Values for bootstrap methods. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values and estimates.  It values only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level    Assuming Lognormal Distribution	5.023 0.555 296.8 N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dispersations for the observations for th	ct Values for bootstrap methods. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values and estimates.  It values only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level    Assuming Lognormal Distribution	5.023 0.555 296.8 N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dispersations for the observations for th	ct Values for bootstrap methods. Istinct values may not be reliable. For accurate and meaningful results and estimates.  Itics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Criginal Scale SD in Original Scale SD in Original Scale	5.023 0.555 296.5 N/A N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct dusing 4 to 9 dispersations for the observations for th	ct Values for bootstrap methods. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values may not be reliable. Istinct values and estimates.  It values only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level    Assuming Lognormal Distribution	5.023 0.555 296.5 N/A N/A N/A

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A D Took Obstication	N1/A	Name and state Obstation	
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	100
K-S Test Statistic	N/A	Mean	138
5% K-S Critical Value	N/A	SD	99
Data not Gamma Distributed at 5% Significance Leve	I	SE of Mean	99
		95% KM (t) UCL	326
Assuming Gamma Distribution		95% KM (z) UCL	301
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	387
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	2
Mean	N/A	95% KM (Percentile Bootstrap) UCL	2
Median	N/A	95% KM (Chebyshev) UCL	570
SD	N/A	97.5% KM (Chebyshev) UCL	757
k star	N/A	99% KM (Chebyshev) UCL	11
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (BCA) UCL	2
95% Gamma Approximate UCL (Use when n >= 40)	N/A		
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
DL/2 is not a recommended method.			
		vided to help the user to select the most appropriate 95% UCL.	
These recommendations are based upon the results	of the simu	ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight,	the user ma	ay want to consult a statistician.	

	General Statistics		
Number of Valid Data	8	Number of Detected Data	
Number of Distinct Detected Data	1	Number of Non-Detect Data	
		Percent Non-Detects	87.50
Warning: Only one distinct data value was detected!	Product (or any other se	ontware, should not be used on such a data set:	
It is suggested to use alternative site specific values determin			, BTV).
	ned by the Project Team	to estimate environmental parameters (e.g., EPC,	, BTV).

INDENO(1,2,3-CD)PYRENE			
	General Sta	atistics	
Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	6
		Percent Non-Detects	75.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	24.6	Minimum Detected	3.203
Maximum Detected	99.1	Maximum Detected	4.596
Mean of Detected	61.85	Mean of Detected	3.899
SD of Detected	52.68	SD of Detected	0.98
Minimum Non-Detect	330	Minimum Non-Detect	5.79
Maximum Non-Detect	410	Maximum Non-Detect	6.016
		N 1 1 1 1 1 1 5 1 1	
Note: Data have multiple DLs - Use of KM Method is recommen	ded	Number treated as Non-Detect	3
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	100.000
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: Data s	et has only 2 l	Distinct Detected Values.	
		ningful and reliable test statistics and estimates.	
		ues to estimate environmental parameters (e.g., EPC, BTV).	
The minute of detected data main not be ad-		to the manufacture OOF to the headstroom, and DOO months also	
		h to perform GOF tests, bootstrap, and ROS methods. value on your output display!	
Those methods will	return a 'N/A'	value on your output display!	
Those methods will  It is necessary to have 4	return a 'N/A' or more Distir	value on your output display!  nct Values for bootstrap methods.	
Those methods will  It is necessary to have 4 However, results obtained	or more Distir	value on your output display!	
Those methods will  It is necessary to have 4 However, results obtained	or more Distir	value on your output display!  nct Values for bootstrap methods. distinct values may not be reliable.	
Those methods will  It is necessary to have 4 However, results obtained	or more Distir	value on your output display!  nct Values for bootstrap methods.  distinct values may not be reliable. s for accurate and meaningful results and estimates.	
Those methods will  It is necessary to have 4 However, results obtained	or more Distir d using 4 to 9 de observations UCL Stati	value on your output display!  nct Values for bootstrap methods.  distinct values may not be reliable. s for accurate and meaningful results and estimates.	у
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati	value on your output display!  nct Values for bootstrap methods. distinct values may not be reliable. s for accurate and meaningful results and estimates.  istics	y N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	or more Distir d using 4 to 9 de observations	value on your output display!  nct Values for bootstrap methods. distinct values may not be reliable. s for accurate and meaningful results and estimates.  istics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	•
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati	value on your output display!  nct Values for bootstrap methods. distinct values may not be reliable. s for accurate and meaningful results and estimates.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati	value on your output display!  nct Values for bootstrap methods. distinct values may not be reliable. s for accurate and meaningful results and estimates.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati	value on your output display!  nct Values for bootstrap methods. distinct values may not be reliable. s for accurate and meaningful results and estimates.  istics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati	value on your output display!  nct Values for bootstrap methods. distinct values may not be reliable. s for accurate and meaningful results and estimates.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati  N/A  N/A  148	value on your output display!  nct Values for bootstrap methods. distinct values may not be reliable. s for accurate and meaningful results and estimates.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	N/A N/A 4.854
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati  N/A  N/A  N/A  148  58.1	value on your output display!  nct Values for bootstrap methods. distinct values may not be reliable. s for accurate and meaningful results and estimates.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	N/A N/A 4.854
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati  N/A  N/A  148	value on your output display!  nct Values for bootstrap methods. distinct values may not be reliable. s for accurate and meaningful results and estimates.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	N/A N/A 4.854
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati  N/A  N/A  N/A  148  58.1	value on your output display!  nct Values for bootstrap methods. distinct values may not be reliable. s for accurate and meaningful results and estimates.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	N/A N/A 4.85-
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati N/A N/A N/A  148 58.1 186.9	value on your output display!  Inct Values for bootstrap methods.  distinct values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values only shapiro Wilk Test Statistic Incompanies of Shapiro Wilk Critical Value of Shapiro Wilk	N/A N/A N/A 4.85- 0. 337.
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati N/A N/A N/A  148 58.1 186.9	value on your output display!  Inct Values for bootstrap methods.  distinct values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values only shapiro Wilk Test Statistic. Incomparison of Shapiro Wilk Test Statistic. Incomparison of Shapiro Wilk Critical Value of Shapiro Wilk Critical Val	1.85 0.337.
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati N/A N/A N/A  148 58.1 186.9	value on your output display!  Inct Values for bootstrap methods.  distinct values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values only shapiro Wilk Critical Values only Shapiro Wilk Test Statistic on Shapiro Wilk Critical Value on the Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shap	N/A N/A N/A 4.85- 0. 337. N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati N/A N/A N/A  148 58.1 186.9	value on your output display!  Inct Values for bootstrap methods.  distinct values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values only shapiro Wilk Critical Values only Shapiro Wilk Test Statistic Statisti	N/A N/A N/A 4.854 0.337.3 N/A N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati N/A N/A N/A  148 58.1 186.9	value on your output display!  Inct Values for bootstrap methods.  distinct values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values only shapiro Wilk Critical Values only Shapiro Wilk Test Statistic on Shapiro Wilk Critical Value on the Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical	N/A N/A N/A 4.85- 0. 337. N/A N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati N/A N/A N/A  148 58.1 186.9	value on your output display!  Inct Values for bootstrap methods.  distinct values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values only shapiro Wilk Critical Values only Shapiro Wilk Test Statistic on Shapiro Wilk Critical Value on the Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical	N/A N/A N/A 4.85- 0. 337. N/A N/A N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' or more Distir d using 4 to 9 de observations  UCL Stati N/A N/A N/A  148 58.1 186.9	value on your output display!  Inct Values for bootstrap methods.  distinct values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values may not be reliable. Inct Values only shapiro Wilk Critical Values only Shapiro Wilk Test Statistic on Shapiro Wilk Critical Value on the Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical Value of Shapiro Wilk Critical	N/A N/A N/A 4.852 0.7 337.7 N/A N/A N/A N/A

Gamma Distribution Test with Detected Values Only	,	Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A	Zata do nocionos a Dioconiadio Diocindados (ciso)	
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	61.
5% K-S Critical Value	N/A	SD	37.
Data not Gamma Distributed at 5% Significance Leve	el	SE of Mean	37.
		95% KM (t) UCL	132
Assuming Gamma Distribution		95% KM (z) UCL	123
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	155
Minimum	N/A	95% KM (bootstrap t) UCL	117
Maximum	N/A	95% KM (BCA) UCL	N/A
Mean	N/A	95% KM (Percentile Bootstrap) UCL	99
Median	N/A	95% KM (Chebyshev) UCL	224
SD	N/A	97.5% KM (Chebyshev) UCL	294
k star	N/A	99% KM (Chebyshev) UCL	432
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	132
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	99
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
	ded UCL exc	ceeds the maximum observation	
L/2 is not a recommended method.			
		vided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight	, the user ma	ay want to consult a statistician.	

RSENIC			
	General	Statistics	
Number of Valid Data	8	Number of Detected Data	
Number of Distinct Detected Data	7	Number of Non-Detect Data	
		Percent Non-Detects	12.50
Raw Statistics  Minimum Detected	2.8	Log-transformed Statistics  Minimum Detected	1.0
Maximum Detected	9.81	Maximum Detected	2.28
Mean of Detected	4.824	Mean of Detected	1.47
SD of Detected	2.498	SD of Detected	0.45
Minimum Non-Detect	2.9	Minimum Non-Detect	1.00
Maximum Non-Detect	2.9	Maximum Non-Detect	1.0
Warning: There	are only 7 I	Detected Values in this data	
Note: It should be noted that ev	ven though b	ootstrap may be performed on this data set	
the resulting calculations	may not be	reliable enough to draw conclusions	
It is recommended to have 10-15 or m		observations for accurate and meaningful results.	
Normal Distribution Test with Detected Values Only	UCL St	atistics  Lognormal Distribution Test with Detected Values Only	,
Shapiro Wilk Test Statistic	0.823	Shapiro Wilk Test Statistic	0.9
5% Shapiro Wilk Critical Value	0.823	5% Shapiro Wilk Critical Value	0.80
Data appear Normal at 5% Significance Level	0.003	Data appear Lognormal at 5% Significance Level	0.00
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.403	Mean	1.3
SD	2.602	SD	0.5
95% DL/2 (t) UCL	6.146	95% H-Stat (DL/2) UCL	7.69
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	4.139	Mean in Log Scale	1.39
SD	2.785	SD in Log Scale	0.48
95% MLE (t) UCL	6.005	Mean in Original Scale	4.49
95% MLE (Tiku) UCL	6.048	SD in Original Scale	2.49
(**************************************		95% t UCL	6.16
		95% Percentile Bootstrap UCL	5.92
		95% BCA Bootstrap UCL	6.34
		95% H UCL	6.92
Gamma Distribution Test with Detected Values Only	v	Data Distribution Test with Detected Values Only	
k star (bias corrected)	3.182	Data appear Normal at 5% Significance Level	
Theta Star	1.516	···	
nu star	44.55		
A-D Test Statistic	0.417	Nonparametric Statistics	
5% A-D Critical Value	0.71	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.71	Mean	4.57
5% K-S Critical Value	0.313	SD	2.26
Data appear Gamma Distributed at 5% Significance Le		SE of Mean	0.86
		95% KM (t) UCL	6.2
Assuming Gamma Distribution		95% KM (z) UCL	5.99
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	6.18
danima 1.00 otatiotico aonig Extrapolateu Data	1.258	95% KM (bootstrap t) UCL	8.34
Minimum		95% KM (BCA) UCL	6.0
0 1	9.81		
Minimum	4.378	95% KM (Percentile Bootstrap) UCL	6.02
Minimum Maximum	4.378 3.55	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL	8.3
Minimum Maximum Mean	4.378	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL	8.3 9.9
Minimum Maximum Mean Median SD k star	4.378 3.55 2.634 2.204	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL	8.3 9.9
Minimum Maximum Mean Median SD k star Theta star	4.378 3.55 2.634 2.204 1.987	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL	8.3 9.9
Minimum Maximum Mean Median SD k star Theta star Nu star	4.378 3.55 2.634 2.204 1.987 35.26	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use	8.3 9.9 13.
Minimum Maximum Mean Median SD k star Theta star Nu star AppChi2	4.378 3.55 2.634 2.204 1.987 35.26 22.68	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use 95% KM (t) UCL	8.3 9.9 13.
Minimum Maximum Mean Median SD k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40)	4.378 3.55 2.634 2.204 1.987 35.26 22.68 6.809	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use	8.3 9.9 13.
Minimum Maximum Mean Median SD k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	4.378 3.55 2.634 2.204 1.987 35.26 22.68	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use 95% KM (t) UCL	
Minimum Maximum Mean Median SD k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40) lote: DL/2 is not a recommended method.	4.378 3.55 2.634 2.204 1.987 35.26 22.68 6.809 7.658	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use 95% KM (t) UCL 95% KM (Percentile Bootstrap) UCL	8.3 9.9 13.
Minimum  Maximum  Mean  Median  SD  k star  Theta star  Nu star  AppChi2  95% Gamma Approximate UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  lote: DL/2 is not a recommended method.  Note: Suggestions regarding the selection of a 95%	4.378 3.55 2.634 2.204 1.987 35.26 22.68 6.809 7.658	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use 95% KM (t) UCL	8.3 9.9 13.

CHROMIUM			
	General Sta	atistics	
Number of Valid Data	8	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	2
		Percent Non-Detects	25.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	6.7	Minimum Detected	1.902
Maximum Detected	16.1	Maximum Detected	2.779
Mean of Detected	9.397	Mean of Detected	2.195
SD of Detected	3.439	SD of Detected	0.313
Minimum Non-Detect	6.5	Minimum Non-Detect	1.872
Maximum Non-Detect	6.9	Maximum Non-Detect	1.932
   Note: Data have multiple DLs - Use of KM Method is recommen	ded	Number treated as Non-Detect	3
For all methods (except KM, DL/2, and ROS Methods),	ueu	Number treated as Non-Betect	5
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	37.50%
Note: It should be noted that ev	en though boo	tected Values in this data otstrap may be performed on this data set eliable enough to draw conclusions	
Note: It should be noted that ev the resulting calculations	en though boo may not be re ore distinct ob	otstrap may be performed on this data set sliable enough to draw conclusions eservations for accurate and meaningful results.	
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or meaning the state of the	may not be re ore distinct ob	otstrap may be performed on this data set cliable enough to draw conclusions eservations for accurate and meaningful results.	
Note: It should be noted that even the resulting calculations  It is recommended to have 10-15 or more and the strict of the str	may not be re ore distinct ob	otstrap may be performed on this data set eliable enough to draw conclusions eservations for accurate and meaningful results. elistics  Lognormal Distribution Test with Detected Values Only	
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or more and the short of the short of the short of the short of the short of the short of the should be noted that ever the short of the short o	en though boo may not be re ore distinct ob UCL Stati	otstrap may be performed on this data set cliable enough to draw conclusions eservations for accurate and meaningful results.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	0.856
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or more and the short of th	may not be re ore distinct ob	otstrap may be performed on this data set cliable enough to draw conclusions eservations for accurate and meaningful results.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or more and the short of the short of the short of the short of the short of the short of the should be noted that ever the short of the short o	en though boo may not be re ore distinct ob UCL Stati	otstrap may be performed on this data set cliable enough to draw conclusions eservations for accurate and meaningful results.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	0.856
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or more in the second of the seco	en though boo may not be re ore distinct ob UCL Stati	otstrap may be performed on this data set cliable enough to draw conclusions eservations for accurate and meaningful results.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level	0.856
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or more and the short of th	en though boo may not be re ore distinct ob UCL Stati	otstrap may be performed on this data set cliable enough to draw conclusions eservations for accurate and meaningful results.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.856
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or more in the second of the seco	en though boo may not be re ore distinct ob UCL Stati	otstrap may be performed on this data set eliable enough to draw conclusions eservations for accurate and meaningful results.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.856 0.788
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or make the properties of the resulting calculations  It is recommended to have 10-15 or make the resulting calculations of the resulting calculations.  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method	ore distinct ob  UCL Stati  0.769  0.788	otstrap may be performed on this data set cliable enough to draw conclusions eservations for accurate and meaningful results.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	0.856 0.788
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or more in the resulting calculations.  It is recommended to have 10-15 or more in the resulting calculations.  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	ore distinct ob  UCL Stati  0.769  0.788	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Assuming Lognormal Distribution Method Mean	0.856 0.788 1.948 0.528
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or make the present of the presentation of the present of the	ore distinct ob  UCL Stati  0.769  0.788  7.885  4.035	otstrap may be performed on this data set cliable enough to draw conclusions eservations for accurate and meaningful results.  Estics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.856 0.788 1.948 0.528
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or more in the resulting calculations.  It is recommended to have 10-15 or more in the resulting calculations.  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	ore distinct ob  UCL Stati  0.769  0.788  7.885  4.035	otstrap may be performed on this data set cliable enough to draw conclusions eservations for accurate and meaningful results.  Estics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	0.856 0.788 1.948 0.528
Note: It should be noted that ev the resulting calculations  It is recommended to have 10-15 or m  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	ore distinct ob  UCL Stati  0.769  0.788  7.885  4.035  10.59	Assuming Lognormal Distribution  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.856 0.788 1.948 0.528 13.03
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or mean and the state of th	ore distinct ob  UCL Stati  0.769  0.788  7.885  4.035  10.59  7.663	Assuming Lognormal Distribution  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	1.948 0.528 13.03
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or make the resulting calculations  It is recommended to have 10-15 or make the resulting calculations  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD	0.769 0.788 0.7885 4.035 10.59	Assuming Lognormal Distribution  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Log Scale	1.948 0.528 13.03 2.034 0.401 8.233
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or many shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD 95% MLE (t) UCL	en though boo may not be re- ore distinct ob UCL Stati 0.769 0.788 7.885 4.035 10.59 7.663 4.121 10.42	Assuming Lognormal Distribution  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	1.948 0.528 13.03 2.034 0.401 8.233 3.626
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or many shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD 95% MLE (t) UCL	en though boo may not be re- ore distinct ob UCL Stati 0.769 0.788 7.885 4.035 10.59 7.663 4.121 10.42	Assuming Lognormal Distribution  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Original Scale  95% t UCL  95% Percentile Bootstrap UCL	1.948 0.528 13.03 2.034 0.401 8.233 3.626 10.66
Note: It should be noted that ever the resulting calculations  It is recommended to have 10-15 or many shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD 95% MLE (t) UCL	en though boo may not be re- ore distinct ob UCL Stati 0.769 0.788 7.885 4.035 10.59 7.663 4.121 10.42	Assuming Lognormal Distribution  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  95% t UCL	1.948 0.528 13.03 2.034 0.401

CHROMIUM (Continued)			
Gamma Distribution Test with Detected Values Only	,	Data Distribution Test with Detected Values Only	
k star (bias corrected)	5.725	Data appear Gamma Distributed at 5% Significance Lev	rel
Theta Star	1.641		
nu star	68.7		
A-D Test Statistic	0.563	Nonparametric Statistics	
5% A-D Critical Value	0.698	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.698	Mean	8.723
5% K-S Critical Value	0.332	SD	2.959
Data appear Gamma Distributed at 5% Significance Le	vel	SE of Mean	1.146
		95% KM (t) UCL	10.89
Assuming Gamma Distribution		95% KM (z) UCL	10.61
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	10.78
Minimum	0.539	95% KM (bootstrap t) UCL	13.42
Maximum	16.1	95% KM (BCA) UCL	11.11
Mean	7.515	95% KM (Percentile Bootstrap) UCL	10.76
Median	7.6	95% KM (Chebyshev) UCL	13.72
SD	4.592	97.5% KM (Chebyshev) UCL	15.88
k star	1.21	99% KM (Chebyshev) UCL	20.12
Theta star	6.21		
Nu star	19.36	Potential UCLs to Use	
AppChi2	10.38	95% KM (Percentile Bootstrap) UCL	10.76
95% Gamma Approximate UCL (Use when n >= 40)	14.02		
95% Adjusted Gamma UCL (Use when n < 40)	16.59		
Note: DL/2 is not a recommended method.			
		vided to help the user to select the most appropriate 95% UCL.	
		lation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight	, the user ma	ay want to consult a statistician.	

	General Statis	itics	
Number of Valid Data	8	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	2
		Percent Non-Detects	25.00%
<b>5 5 3 3</b>			
Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.6	Minimum Detected	0.956
Maximum Detected	9.56	Maximum Detected	2.258
Mean of Detected	5.93	Mean of Detected	1.693
SD of Detected	2.565	SD of Detected	0.472
Minimum Non-Detect	3.5	Minimum Non-Detect	1.253
Maximum Non-Detect	4.6	Maximum Non-Detect	1.526
	led	Number treated as Non-Detect	
For all methods (except KM, DL/2, and ROS Methods),	ieu	Number treated as Non-Betect	4
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	50.00%
Observations > Largest ND are freated as NDs		Single DL Non-Detect Percentage	30.00 %
Warning: There	are only 6 Detec	ted Values in this data	
		rap may be performed on this data set	
		ble enough to draw conclusions	
	•	rvations for accurate and meaningful results.	
	ore distinct obser	rvations for accurate and meaningful results.	
	•	rvations for accurate and meaningful results.	V
It is recommended to have 10-15 or mo	ore distinct obser	rvations for accurate and meaningful results.	
It is recommended to have 10-15 or mo	UCL Statistic	rvations for accurate and meaningful results.  cs  Lognormal Distribution Test with Detected Values Only	0.962
It is recommended to have 10-15 or mo  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	UCL Statistic	rvations for accurate and meaningful results.  cs  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	0.962
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level	UCL Statistic	rvations for accurate and meaningful results.  CS  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	y 0.962 0.788
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level Assuming Normal Distribution	UCL Statistic	rvations for accurate and meaningful results.  cs  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.962
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	UCL Statistic  0.969  0.788	rvations for accurate and meaningful results.  CS  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method	0.962 0.788
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	UCL Statistic 0.969 0.788	rvations for accurate and meaningful results.  CS  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.962 0.788 1.444
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD	UCL Statistic 0.969 0.788 4.954 2.827	rvations for accurate and meaningful results.  CS  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	0.962 0.788 1.444 0.614
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	UCL Statistic 0.969 0.788	rvations for accurate and meaningful results.  CS  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.962 0.788 1.444 0.614
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Statistic 0.969 0.788 4.954 2.827	rvations for accurate and meaningful results.  CS  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.962 0.788 1.444 0.614
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL Statistic  0.969 0.788  4.954 2.827 6.847	rvations for accurate and meaningful results.  CS  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.962 0.788 1.444 0.614 9.274
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean	UCL Statistic  0.969 0.788  4.954 2.827 6.847	rvations for accurate and meaningful results.  CS  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	0.962 0.788 1.444 0.614 9.274
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD	UCL Statistic 0.969 0.788  4.954 2.827 6.847  4.629 3.13	rvations for accurate and meaningful results.  CS  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale	0.962 0.788 1.444 0.614 9.274 1.532
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD 95% MLE (t) UCL	UCL Statistic 0.969 0.788  4.954 2.827 6.847  4.629 3.13 6.726	rvations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	0.962 0.788 1.444 0.614 9.274 1.532 0.5 5.163
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD	UCL Statistic 0.969 0.788  4.954 2.827 6.847  4.629 3.13	rvations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	1.444 0.614 9.274 1.532 0.5 5.163 2.595
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD 95% MLE (t) UCL	UCL Statistic 0.969 0.788  4.954 2.827 6.847  4.629 3.13 6.726	rvations for accurate and meaningful results.  CS  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Criginal Scale SD in Original Scale 95% t UCL	1.444 0.614 9.274 1.532 0.5 5.163 2.595 6.901
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD 95% MLE (t) UCL	UCL Statistic 0.969 0.788  4.954 2.827 6.847  4.629 3.13 6.726	rvations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Criginal Scale SD in Original Scale 95% t UCL 95% Percentile Bootstrap UCL	1.444 0.614 9.274 1.532 0.5 5.163 2.595 6.901 6.623
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD 95% MLE (t) UCL	UCL Statistic 0.969 0.788  4.954 2.827 6.847  4.629 3.13 6.726	rvations for accurate and meaningful results.  CS  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Criginal Scale SD in Original Scale 95% t UCL	1.444 0.614 9.274 1.532 0.5 5.163 2.595

COBALT (Continued)			
Gamma Distribution Test with Detected Values Only	,	Data Distribution Test with Detected Values Only	
k star (bias corrected)	3.074	Data appear Normal at 5% Significance Level	
Theta Star	1.929	<u> </u>	
nu star	36.88		
A-D Test Statistic	0.211	Nonparametric Statistics	
5% A-D Critical Value	0.698	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.698	Mean	5.173
5% K-S Critical Value	0.033	SD	2.439
Data appear Gamma Distributed at 5% Significance Le		SE of Mean	0.954
Data appear Garrina Distributed at 0 % digrimodrice Ed	701	95% KM (t) UCL	6.98
Assuming Gamma Distribution		95% KM (z) UCL	6.742
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	6.975
Minimum	1.858	95% KM (bootstrap t) UCL	7.224
Maximum	9.56	95% KM (BCA) UCL	7.143
Mean	5.049	95% KM (Percentile Bootstrap) UCL	6.898
Median	4.5	95% KM (Chebyshev) UCL	9.331
SD	2.729	97.5% KM (Chebyshev) UCL	11.13
k star	2.473	99% KM (Chebyshev) UCL	14.66
Theta star	2.041		
Nu star	39.57	Potential UCLs to Use	
AppChi2	26.16	95% KM (t) UCL	6.98
95% Gamma Approximate UCL (Use when n >= 40)	7.637	95% KM (Percentile Bootstrap) UCL	6.898
95% Adjusted Gamma UCL (Use when n < 40)	8.524	,	
Note: DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight	, the user m	ay want to consult a statistician.	

Con	aral LICI. Statistics f	ion Full Date	. Cata	
User Selected Options	eral UCL Statistics f	or Full Data	Sets	
	ork Folders\Projects	s\Newport\[	Derecktor\Draft Final Risk Assessment\EPCs\Unpaved Surface S	oil - North
Full Precision OFF		•	·	
Confidence Coefficient 95%				
Number of Bootstrap Operations 2000	)			
LUMINUM				
		Genera	l Statistics	
Number of	Valid Observations	8	Number of Distinct Observations	8
Raw Statisti	cs		Log-transformed Statistics	
	Minimum		Minimum of Log Data	
	Maximum		Maximum of Log Data	
		5263	Mean of log Data	
	Geometric Mean Median		SD of log Data	0.324
		2003		
	Std. Error of Mean			
Со	efficient of Variation			
	Skewness	1.86		
	Warning:	There are	only 8 Values in this data	
			strap methods may be performed on this data set,	
the i	resulting calculation	s may not b	e reliable enough to draw conclusions	
The literature sug	gests to use bootstr	ap methods	on data sets having more than 10-15 observations.	
		Polovant I	JCL Statistics	
Normal Distributi	on Test	T CICVATIL C	Lognormal Distribution Test	
	o Wilk Test Statistic	0.762	Shapiro Wilk Test Statistic	0.847
	o Wilk Critical Value		Shapiro Wilk Critical Value	
Data not Normal at 5% Signature	gnificance Level	•	Data appear Lognormal at 5% Significance Level	
Assuming Normal D	istribution		Assuming Lognormal Distribution	
	5% Student's-t UCL	6604	95% H-UCL	6806
95% UCLs (Adjusted to			95% Chebyshev (MVUE) UCL	
95% Adjusted-CL	T UCL (Chen-1995)	6925	97.5% Chebyshev (MVUE) UCL	
95% Modified-t U	ICL (Johnson-1978)	6682	99% Chebyshev (MVUE) UCL	11228
Gamma Distributi			Data Distribution	
k	star (bias corrected)		Data appear Lognormal at 5% Significance Level	
	Theta Star			
MI E of	MLE of Mean Standard Deviation			
IVILL OI	nu star			
Approximate Chi	Square Value (.05)		Nonparametric Statistics	
	evel of Significance		95% CLT UCL	6428
Adjuste	d Chi Square Value	73.9	95% Jackknife UCL	
		0.70	95% Standard Bootstrap UCL	
	Darling Test Statistic		95% Bootstrap-t UCL	
	ng 5% Critical Value mirnov Test Statistic		95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	
	ov 5% Critical Value		95% BCA Bootstrap UCL	
Data not Gamma Distributed at			95% Chebyshev(Mean, Sd) UCL	
			97.5% Chebyshev(Mean, Sd) UCL	
Assuming Gamma D				12310
95% Approximate Gamma UCL	`			
95% Adjusted Gamma UCI	_ (Use when n < 40)	/195		
Potential UCL t	o Use		Use 95% Student's-t UCL	
			or 95% Modified-t UCL	
			or 95% H-UCL	6806
			tic based UCLs for historical reasons only.	
			ues of UCL95 as shown in examples in the Technical Guide.	
			the use of H-statistic based 95% UCLs.	
			95 for skewed data sets which do not follow a gamma distribution	
			rovided to help the user to select the most appropriate 95% UCI simulation studies summarized in Singh, Singh, and laci (2002)	<del></del>
			nsight, the user may want to consult a statistician.	

	General S	Statistics	
Number of Valid Observations	8	Number of Distinct Observations	8
Raw Statistics		Log-transformed Statistics	
Minimum	11500	Minimum of Log Data	0 35
Maximum		Maximum of Log Data	
	15125	Mean of log Data	
Geometric Mean		SD of log Data	
Median		02 0.10g 2 a.a.	0.00
	5485		
Std. Error of Mean	1939		
Coefficient of Variation	0.363		
Skewness	1.923		
		y 8 Values in this data	
		rap methods may be performed on this data set,	
the resulting calculation	s may not be	reliable enough to draw conclusions	
The literature suggests to use bootstr	ap methods o	n data sets having more than 10-15 observations.	
	Relevant UC	N. Statistica	
Normal Distribution Test	Relevant UC	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.69	Shapiro Wilk Test Statistic	0.73
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
Data not Normal at 5% Significance Level	0.010	Data not Lognormal at 5% Significance Level	0.01
Data not Normal at 376 digililicance Level		Data not Eognomial at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	18799	95% H-UCL	1918
95% UCLs (Adjusted for Skewness)	.,	95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)	19724	97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL	
,		, , ,	
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	7.047	Data do not follow a Discernable Distribution (0.05	)
Theta Star	2146		
MLE of Mean	15125		
MLE of Standard Deviation	5697		
nu star	112.8		
Approximate Chi Square Value (.05)		Nonparametric Statistics	
Adjusted Level of Significance	0.0195	95% CLT UCL	1831
Adjusted Chi Square Value	83.96	95% Jackknife UCL	
		95% Standard Bootstrap UCL	
Anderson-Darling Test Statistic		95% Bootstrap-t UCL	
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL	
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL	
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL	
Data not Gamma Distributed at 5% Significance Lev	vel	95% Chebyshev(Mean, Sd) UCL	
		97.5% Chebyshev(Mean, Sd) UCL	
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3441
95% Approximate Gamma UCL (Use when n >= 40)			
95% Adjusted Gamma UCL (Use when n < 40)	20312		
Potential LICI to Lice		Use 95% Student's-t UCL	1270
Potential UCL to Use		or 95% Modified-t UCL	
		or 35 % iviouilled-t OCL	1301
Note: Suggestions regarding the selection of a 05%	6 UCL are prov	vided to help the user to select the most appropriate 95% UCI	

	General	Statistics	
Number of Valid Observations	8	Number of Distinct Observations	7
Daw Otakiakia		Land American and Obstitution	
Raw Statistics	04.4	Log-transformed Statistics	4.000
Minimum		Minimum of Log Data	
Maximum		Maximum of Log Data	
	170.9	Mean of log Data	
Geometric Mean		SD of log Data	0.458
Median			
	86.2		
Std. Error of Mean			
Coefficient of Variation			
Skewness	1.325		
		nly 8 Values in this data	
		strap methods may be performed on this data set,	
the resulting calculations	s may not be	e reliable enough to draw conclusions	
The literature suggests to use bootstra	ap methods	on data sets having more than 10-15 observations.	
	Relevant U	ICL Statistics	
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
Shapiro Wilk Critical Value	0.818	Shapiro Wilk Critical Value	0.818
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	228.7	95% H-UCL	
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	290.7
95% Adjusted-CLT UCL (Chen-1995)	236.3	97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)	231	99% Chebyshev (MVUE) UCL	445.7
Gamma Distribution Test	I	Data Distribution	
k star (bias corrected)		Data appear Normal at 5% Significance Level	
Theta Star			
MLE of Mean			
MLE of Standard Deviation			
	54.45		
Approximate Chi Square Value (.05)		Nonparametric Statistics	
Approximate Chi Square Value (.05) Adjusted Level of Significance	0.0195	95% CLT UCL	
Approximate Chi Square Value (.05)	0.0195	95% CLT UCL 95% Jackknife UCL	228.7
Approximate Chi Square Value (.05) Adjusted Level of Significance	0.0195	95% CLT UCL	228.7
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	0.0195 35.13 0.55	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL	228.7 216.8 335.6
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	0.0195 35.13 0.55	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL	228.7 216.8 335.6
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	0.0195 35.13 0.55 0.719	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL	228.7 216.8 335.6 656.1
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	0.0195 35.13 0.55 0.719 0.315	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL	228.7 216.8 335.6 656.1 221.2
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	0.0195 35.13 0.55 0.719 0.315 0.295	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	228.7 216.8 335.6 656.1 221.2 228.1
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	0.0195 35.13 0.55 0.719 0.315 0.295	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	228.7 216.8 335.6 656.1 221.2 228.1 303.8
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance	0.0195 35.13 0.55 0.719 0.315 0.295	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	228.7 216.8 335.6 656.1 221.2 228.1 303.8 361.2
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Oata follow Appr. Gamma Distribution at 5% Significance Assuming Gamma Distribution	0.0195 35.13 0.55 0.719 0.315 0.295 e Level	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	228.7 216.8 335.6 656.1 221.2 228.1 303.8 361.2
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance	0.0195 35.13 0.55 0.719 0.315 0.295 <b>e Level</b>	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	228.7 216.8 335.6 656.1 221.2 228.1 303.8 361.2
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Oata follow Appr. Gamma Distribution at 5% Significance  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	0.0195 35.13 0.55 0.719 0.315 0.295 <b>e Level</b>	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	228.7 216.8 335.6 656.1 221.2 228.1 303.8 361.2
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Oata follow Appr. Gamma Distribution at 5% Significance  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	0.0195 35.13 0.55 0.719 0.315 0.295 <b>e Level</b>	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	228.7 216.8 335.6 656.1 221.2 228.1 303.8 361.2 474.2
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Oata follow Appr. Gamma Distribution at 5% Significance  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use	0.0195 35.13 0.55 0.719 0.315 0.295 <b>e Level</b> 241.8 264.9	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL	228.7 216.8 335.6 656.1 221.2 228.1 303.8 361.2 474.2

**North Waterfront** 

**Surface Soil** 

I IGE	eneral UCL Statistics for	r Doto Soto	with Non Detecto	
User Selected Options	sileiai OCL Statistics ic	Dala Sels	With Non-Detects	
	\Work Folders\Projects	\Newnort\De	erecktor\Draft Final Risk Assessment\EPCs\Surface Soil - North	Waterfront
Full Precision OF				
Confidence Coefficient 95				
Number of Bootstrap Operations 20				
DENIZO(A)ANITHDACENE				
BENZO(A)ANTHRACENE				
		General	Statistics	
	Number of Valid Data	19		4
Number of D	Distinct Detected Data	4	Number of Non-Detect Data	15
			Percent Non-Detects	78.95%
Raw Statis			Log-transformed Statistics	
	Minimum Detected	15.7	Minimum Detected	2.754
	Maximum Detected	605	Maximum Detected	6.405
	Mean of Detected	221.1	Mean of Detected SD of Detected	4.516
	SD of Detected Minimum Non-Detect	274.2 3.56	Minimum Non-Detect	1.699 1.27
	Maximum Non-Detect	12000	Maximum Non-Detect	9.393
	Maximum Non-Detect	12000	Maximum Non-Detect	9.393
Note: Data have multiple DLs - Use of KI	M Method is recommer	nded	Number treated as Non-Detect	19
For all methods (except KM, DL/2, and R		iaca	Number treated as Detected	0
Observations < Largest ND are treated a			Single DL Non-Detect Percentage	100.00%
3			5	
	Warning: There are	only 4 Disti	inct Detected Values in this data	
Note: It s	should be noted that ev	en though t	pootstrap may be performed on this data set	
the	e resulting calculations	may not be	reliable enough to draw conclusions	
It is recommend	ded to have 10-15 or m	ore distinct	observations for accurate and meaningful results.	
l		IICI S	tatistics	
Normal Distribution Test with	Detected Values Only		tatistics  Lognormal Distribution Test with Detected Values On	lv
Normal Distribution Test with			Lognormal Distribution Test with Detected Values On	
Shap	piro Wilk Test Statistic	,		0.933 0.748
Shap	piro Wilk Test Statistic piro Wilk Critical Value	0.853	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic	0.933
Shap 5% Shap Data appear Normal at 5%	piro Wilk Test Statistic biro Wilk Critical Value % Significance Level	0.853	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	0.933
Shap 5% Shap Data appear Normal at 5% Assuming Normal	piro Wilk Test Statistic biro Wilk Critical Value  % Significance Level  I Distribution	0.853	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level Assuming Lognormal Distribution	0.933
Shap 5% Shap Data appear Normal at 5% Assuming Normal	piro Wilk Test Statistic biro Wilk Critical Value % Significance Level	0.853 0.748	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method	0.933 0.748
Shap 5% Shap Data appear Normal at 5% Assuming Normal	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method Mean	0.853 0.748 486.4	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean	0.933 0.748 4.995
Shap 5% Shap Data appear Normal at 5% Assuming Normal	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method Mean SD	0.853 0.748 486.4 1341	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	0.933 0.748 4.995 1.553
Shap 5% Shap Data appear Normal at 5% Assuming Normal	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method Mean	0.853 0.748 486.4	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean	0.933 0.748 4.995
Shap 5% Shap Data appear Normal at 5% Assuming Normal DL/:	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method  Mean  SD  95% DL/2 (t) UCL	0.853 0.748 486.4 1341 1020	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.933 0.748 4.995 1.553
Shap 5% Shap Data appear Normal at 5%  Assuming Normal DL/2  Maximum Likelihood E	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Estimate(MLE) Method	0.853 0.748 486.4 1341	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.933 0.748 4.995 1.553 1760
Shap 5% Shap <b>Data appear Normal at 5%</b> Assuming Normal DL/:	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Estimate(MLE) Method	0.853 0.748 486.4 1341 1020	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	0.933 0.748 4.995 1.553 1760
Shap 5% Shap Data appear Normal at 5%  Assuming Normal DL/2  Maximum Likelihood E	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Estimate(MLE) Method	0.853 0.748 486.4 1341 1020	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale	0.933 0.748 4.995 1.553 1760 3.397 1.229
Shap 5% Shap Data appear Normal at 5%  Assuming Normal DL/2  Maximum Likelihood E	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Estimate(MLE) Method	0.853 0.748 486.4 1341 1020	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	0.933 0.748 4.995 1.553 1760 3.397 1.229 71.59
Shap 5% Shap Data appear Normal at 5%  Assuming Normal DL/2  Maximum Likelihood E	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Estimate(MLE) Method	0.853 0.748 486.4 1341 1020	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	0.933 0.748 4.995 1.553 1760 3.397 1.229 71.59 139.2
Shap 5% Shap Data appear Normal at 5%  Assuming Normal DL/2  Maximum Likelihood E	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Estimate(MLE) Method	0.853 0.748 486.4 1341 1020	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale 95% t UCL	0.933 0.748 4.995 1.553 1760 3.397 1.229 71.59 139.2 127
Shap 5% Shap Data appear Normal at 5%  Assuming Normal DL/2  Maximum Likelihood E	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Estimate(MLE) Method	0.853 0.748 486.4 1341 1020	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL 95% Percentile Bootstrap UCL	0.933 0.748 4.995 1.553 1760 3.397 1.229 71.59 139.2 127 131.4
Shap 5% Shap Data appear Normal at 5%  Assuming Normal DL/2  Maximum Likelihood E	piro Wilk Test Statistic piro Wilk Critical Value  % Significance Level  I Distribution  /2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Estimate(MLE) Method	0.853 0.748 486.4 1341 1020	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale 95% t UCL	0.933 0.748 4.995 1.553 1760 3.397 1.229 71.59 139.2 127

Gamma Distribution Test with Detected Values On	ly	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.338	Data appear Normal at 5% Significance Level	
Theta Star	653.6	•	
nu star	2.707		
A-D Test Statistic	0.313	Nonparametric Statistics	
5% A-D Critical Value	0.673	Kaplan-Meier (KM) Method	
K-S Test Statistic		Mean	103
5% K-S Critical Value		SD	150
Data appear Gamma Distributed at 5% Significance L	evel	SE of Mean	59
		95% KM (t) UCL	20
Assuming Gamma Distribution	'	95% KM (z) UCL	20
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	21
Minimum	0.000001	95% KM (bootstrap t) UCL	20
Maximum	605	95% KM (BCA) UCL	27
Mean	82.99	95% KM (Percentile Bootstrap) UCL	29
Median	12.07	95% KM (Chebyshev) UCL	36
SD	149.8	97.5% KM (Chebyshev) UCL	47
k star	0.115	99% KM (Chebyshev) UCL	69
Theta star	722		
Nu star	4.368	Potential UCLs to Use	
AppChi2	0.872	95% KM (t) UCL	20
95% Gamma Approximate UCL (Use when n >= 40)	415.6	95% KM (Percentile Bootstrap) UCL	29
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95%	UCL are pro	ovided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).  ay want to consult a statistician.	

	General Stati	istics	
Number of Valid Data	19	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	15
		Percent Non-Detects	78.95%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	11.7	Minimum Detected	2.46
Maximum Detected	530	Maximum Detected	6.273
Mean of Detected	184.1	Mean of Detected	4.307
SD of Detected	240.6	SD of Detected	1.709
Minimum Non-Detect	3.56	Minimum Non-Detect	1.27
Maximum Non-Detect	12000	Maximum Non-Detect	9.393
Waximum Non-Detect	12000	Maximum Non-Detect	9.535
Note: Data have multiple DLs - Use of KM Method is recommen	ded	Number treated as Non-Detect	19
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	C
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
		Detected Values in this data	
		strap may be performed on this data set	
the resulting calculations	may not be relia	able enough to draw conclusions	
it is recommended to have 10-15 or m	ore distinct obse	ervations for accurate and meaningful results.	
it is recommended to have 10-15 or m		<u> </u>	
	UCL Statist	tics	lv.
Normal Distribution Test with Detected Values Only	UCL Statist	tics Lognormal Distribution Test with Detected Values Onl	
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	UCL Statist	tics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic	0.966
Normal Distribution Test with Detected Values Only	UCL Statist	tics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.966 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level	UCL Statist	tics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	0.966
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level Assuming Normal Distribution	UCL Statist	tics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.966
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	UCL Statist 0.827 0.748	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method	0.966 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	0.827 0.748	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.966 0.748 4.951
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD	UCL Statist 0.827 0.748 478.6 1341	tics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	0.966 0.748 4.951 1.571
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	0.827 0.748	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.966 0.748 4.951 1.571
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	0.827 0.748 478.6 1341 1012	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.966 0.748 4.951
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statist 0.827 0.748 478.6 1341	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.966 0.748 4.951 1.571 1780
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	0.827 0.748 478.6 1341 1012	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	0.966 0.748 4.951 1.571 1780
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.827 0.748 478.6 1341 1012	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale	0.966 0.748 4.951 1.571 1780 3.162 1.251
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.827 0.748 478.6 1341 1012	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	0.966 0.748 4.951 1.571 1780 3.162 1.251 58.7
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.827 0.748 478.6 1341 1012	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	0.966 0.748 4.951 1.571 1780 3.162 1.251 58.7 120.1
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.827 0.748 478.6 1341 1012	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	0.966 0.748 4.951 1.571 1780 3.162 1.251 58.7 120.1 106.5
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.827 0.748 478.6 1341 1012	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL	4.951 1.571 1780 3.162 1.251 58.7 120.1 106.5
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.827 0.748 478.6 1341 1012	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	0.966 0.748 4.951 1.571 1780 3.162 1.251 58.7 120.1 106.5

Gamma Distribution Test with Detected Values On	ly	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.334	Data appear Normal at 5% Significance Level	
Theta Star	551.2		
nu star	2.672		
A-D Test Statistic	0.273	Nonparametric Statistics	
5% A-D Critical Value	0.273	Kaplan-Meier (KM) Method	
K-S Test Statistic		Mean	80.92
5% K-S Critical Value		SD	125.5
Data appear Gamma Distributed at 5% Significance L		SE of Mean	45.88
		95% KM (t) UCL	160.5
Assuming Gamma Distribution		95% KM (z) UCL	156.4
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	161
Minimum	0.000001	95% KM (bootstrap t) UCL	166
Maximum	530	95% KM (BCA) UCL	225.8
Mean	67.57	95% KM (Percentile Bootstrap) UCL	225.8
Median	1.923	95% KM (Chebyshev) UCL	280.9
SD	128.6	97.5% KM (Chebyshev) UCL	367.4
k star	0.115	99% KM (Chebyshev) UCL	537.4
Theta star	587.9		
Nu star	4.368	Potential UCLs to Use	
AppChi2	0.872	95% KM (t) UCL	160.5
95% Gamma Approximate UCL (Use when n >= 40)	338.4	95% KM (Percentile Bootstrap) UCL	225.8
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).  ay want to consult a statistician.	

	General Statis	stics	
Number of Valid Data	19	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	15
	-	Percent Non-Detects	78.95%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	15.5	Minimum Detected	2.741
Maximum Detected	805	Maximum Detected	6.691
Mean of Detected	284.4	Mean of Detected	4.748
SD of Detected	363.7	SD of Detected	1.738
Minimum Non-Detect	3.56	Minimum Non-Detect	1.730
Maximum Non-Detect	12000	Maximum Non-Detect	9.393
Waximum Non-Detect	12000	Waxiiiuiii Noii-Detect	3.330
Note: Data have multiple DLs - Use of KM Method is recommen	ded	Number treated as Non-Detect	19
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	(
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Maming, Those are	amb. 4 Diatimet D	Detected Values in this data	
		trap may be performed on this data set	
		able enough to draw conclusions	
unc resulting calculations	may not be rena	ible chough to draw conclusions	
It is recommended to have 10-15 or m	ore distinct obse	ervations for accurate and meaningful results.	
It is recommended to have 10-15 or m		•	
	ore distinct obse	ics	lv
Normal Distribution Test with Detected Values Only	UCL Statisti	ics Lognormal Distribution Test with Detected Values Onl	
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	UCL Statisti	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic	0.98
Normal Distribution Test with Detected Values Only	UCL Statisti	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	ly 0.98 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level	UCL Statisti	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	0.98
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level Assuming Normal Distribution	UCL Statisti	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.98
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	0.841 0.748	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method	0.98 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	0.841 0.748	ics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.98 0.748 5.044
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	0.841 0.748 499.7	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	0.98 0.748 5.044 1.547
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	0.841 0.748	ics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.98 0.748 5.044 1.547
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	0.841 0.748 0.748 499.7 1342 1033	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.98 0.748 5.044 1.547
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.841 0.748 499.7	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.98 0.748 5.044 1.547
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	0.841 0.748 0.748 499.7 1342 1033	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale	0.98 0.748 5.044 1.547 1817
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.841 0.748 0.748 499.7 1342 1033	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	0.98 0.748 5.044 1.547 1817 3.592 1.266
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.841 0.748 0.748 499.7 1342 1033	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	5.044 1.547 1817 3.592 1.266 90.67
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.841 0.748 0.748 499.7 1342 1033	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	5.044 1.547 1817 3.592 1.266 90.67
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.841 0.748 0.748 499.7 1342 1033	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Log Scale SD in Original Scale 95% t UCL	5.044 1.547 1817 3.592 1.266 90.67 183
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.841 0.748 0.748 499.7 1342 1033	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Log Scale SD in Original Scale 95% t UCL 95% Percentile Bootstrap UCL	5.044 1.547 1817 3.592 1.266 90.67 183 163.5
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.841 0.748 0.748 499.7 1342 1033	ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Log Scale SD in Original Scale 95% t UCL	5.044 1.547 1817 3.592 1.266 90.67 183

Gamma Distribution Test with Detected Values Only	y	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.335	Data appear Normal at 5% Significance Level	
Theta Star	848.7		
nu star	2.68		
A-D Test Statistic	0.238	Nonparametric Statistics	
5% A-D Critical Value	0.674	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.674	Mean	12
5% K-S Critical Value	0.407	SD	19
Data appear Gamma Distributed at 5% Significance Le	evel	SE of Mean	7
		95% KM (t) UCL	2
Assuming Gamma Distribution		95% KM (z) UCL	2
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	2
Minimum	0.000001	95% KM (bootstrap t) UCL	2
Maximum	805	95% KM (BCA) UCL	N.
Mean	105.3	95% KM (Percentile Bootstrap) UCL	3
Median	8.061	95% KM (Chebyshev) UCL	4
SD	196.1	97.5% KM (Chebyshev) UCL	5
k star	0.114	99% KM (Chebyshev) UCL	8
Theta star	926.1		
Nu star	4.32	Potential UCLs to Use	
AppChi2	0.852	95% KM (t) UCL	2
95% Gamma Approximate UCL (Use when n >= 40)	533.8	95% KM (Percentile Bootstrap) UCL	3
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
DL/2 is not a recommended method.			
		vided to help the user to select the most appropriate 95% UCL.	
These recommendations are based upon the result	ts of the sim	ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insigh	t, the user m	ay want to consult a statistician.	

	General Stati	istics	
Number of Valid Data	19	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	15
	-	Percent Non-Detects	78.95%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	16.5	Minimum Detected	2.803
Maximum Detected	580	Maximum Detected	6.363
Mean of Detected	218.6	Mean of Detected	4.581
SD of Detected	260.6	SD of Detected	1.626
Minimum Non-Detect	3.56	Minimum Non-Detect	1.020
Maximum Non-Detect	12000	Maximum Non-Detect	9.393
Waxiiiuiii Noii-Detect	12000	Waximum Non-Detect	3.330
Note: Data have multiple DLs - Use of KM Method is recommen	ded	Number treated as Non-Detect	19
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	C
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Mouning, Thousan	ambe 4 Distinct I	Detected Values in this date	
		Detected Values in this data set strap may be performed on this data set	
		able enough to draw conclusions	
ule resulting calculations	may not be relic	able enough to draw conclusions	
It is recommended to have 10-15 or m	ore distinct obse	ervations for accurate and meaningful results.	
It is recommended to have 10-15 or m		<u> </u>	
	ore distinct obse	tics	h.
Normal Distribution Test with Detected Values Only	UCL Statist	tics  Lognormal Distribution Test with Detected Values Onl	
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	UCL Statist	tics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic	0.95
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	UCL Statist	tics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.95
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	UCL Statist	tics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic	0.95 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	UCL Statist	tics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.95
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level	UCL Statist	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	0.95
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level Assuming Normal Distribution	UCL Statist	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level Assuming Lognormal Distribution	0.95 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	UCL Statist 0.868 0.748	tics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	0.95 0.748 5.009
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	UCL Statist 0.868 0.748	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean	0.95
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	0.868 0.748 485.8 1340 1019	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.95 0.748 5.009 1.536
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statist  0.868  0.748  485.8  1340	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.95 0.748 5.009 1.536 1695
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	0.868 0.748 485.8 1340 1019	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	0.95 0.748 5.009 1.536 1695
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.868 0.748 485.8 1340 1019	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale	5.009 1.536 1695 3.51
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.868 0.748 485.8 1340 1019	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	5.009 1.536 1695 3.51 1.176 73.62
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.868 0.748 485.8 1340 1019	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	5.009 1.536 1695 3.51 1.176 73.62
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.868 0.748 485.8 1340 1019	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	5.009 1.536 1695 3.51 1.176 73.62 133.6
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.868 0.748 485.8 1340 1019	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale 95% t UCL	5.009 1.536 1695 3.51 1.176 73.62 133.6 126.8
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.868 0.748 485.8 1340 1019	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	5.009 1.536 1695 3.51 1.176 73.62 133.6

RYSENE (Continued)			
Gamma Distribution Test with Detected Values Only	y	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.352	Data appear Normal at 5% Significance Level	
Theta Star	620.1	•	
nu star	2.82		
A-D Test Statistic	0.284	Nonparametric Statistics	
5% A-D Critical Value	0.671	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.671	Mean	105
5% K-S Critical Value	0.405	SD	146
Data appear Gamma Distributed at 5% Significance Lo	evel	SE of Mean	59.
		95% KM (t) UCL	2
Assuming Gamma Distribution		95% KM (z) UCL	203
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	2
Minimum	0.000001	95% KM (bootstrap t) UCL	202
Maximum	580	95% KM (BCA) UCL	2
Mean	84.52	95% KM (Percentile Bootstrap) UCL	2
Median	16.5	95% KM (Chebyshev) UCL	365
SD	144.8	97.5% KM (Chebyshev) UCL	477
k star	0.142	99% KM (Chebyshev) UCL	698
Theta star	594.3		
Nu star	5.404	Potential UCLs to Use	
AppChi2	1.343	95% KM (t) UCL	2
95% Gamma Approximate UCL (Use when n >= 40)	340	95% KM (Percentile Bootstrap) UCL	2
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
te: DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insigh	t, the user m	nay want to consult a statistician.	

	General Statistics		
Number of Valid Data	19	Number of Detected Data	
Number of Distinct Detected Data	1	Number of Non-Detect Data	1
		Percent Non-Detects	94.749
It is suggested to use alternative site specific values determ	nined by the Project Tear	n to estimate environmental parameters (e.g., EPC	, BTV).

INDENO(1,2,3-CD)PYRENE			
	General Statis	stics	
Number of Valid Data	19	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	15
14.1101 01 21611101 2010101 2010		Percent Non-Detects	78.95%
Raw Statistics		Log transformed Statistics	
Minimum Detected	12	Log-transformed Statistics  Minimum Detected	2.485
Maximum Detected	380	Maximum Detected	5.94
Mean of Detected	128.9	Mean of Detected	4.056
SD of Detected	171.7	SD of Detected	1.532
Minimum Non-Detect	3.56	Minimum Non-Detect	1.532
Maximum Non-Detect	12000	Maximum Non-Detect	9.393
Note: Data have multiple DLs - Use of KM Method is recommen	ded	Number treated as Non-Detect	19
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	(
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
147	1 45' " 15	N 1971 - 1971 -	
		Detected Values in this data	
		trap may be performed on this data set	
	may not be relia	ible enough to draw conclusions	
· · · · · · · · · · · · · · · · · · ·	•	ervations for accurate and meaningful results.	
· · · · · · · · · · · · · · · · · · ·	ore distinct obse	ervations for accurate and meaningful results.	
It is recommended to have 10-15 or m	•	ervations for accurate and meaningful results.	lv
It is recommended to have 10-15 or m  Normal Distribution Test with Detected Values Only	ore distinct obse	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl	
It is recommended to have 10-15 or more and the second sec	UCL Statisti	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic	0.966
It is recommended to have 10-15 or m  Normal Distribution Test with Detected Values Only	ore distinct obse	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.966
It is recommended to have 10-15 or monomer of the second s	UCL Statisti	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	0.966
It is recommended to have 10-15 or m  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution	UCL Statisti	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	<b>iy</b> 0.966 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	UCL Statisti 0.796 0.748	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method	0.966 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	UCL Statisti 0.796 0.748	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.966 0.748 4.898
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	UCL Statisti 0.796 0.748	ervations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	0.966 0.748
It is recommended to have 10-15 or m  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	UCL Statisti 0.796 0.748	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.966 0.748 4.898 1.567
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Statisti 0.796 0.748 467 1342 1001	ervations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.966 0.748 4.898 1.567
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.796 0.748 467 1342	ervations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.966 0.748 4.898 1.567 1668
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Statisti 0.796 0.748 467 1342 1001	ervations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	0.966 0.748 4.898 1.567 1668
It is recommended to have 10-15 or monomer in the second of the second o	UCL Statisti 0.796 0.748 467 1342 1001	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD	0.966 0.748 4.898 1.567 1668 3.014 1.14
It is recommended to have 10-15 or monomer in the second of the second o	UCL Statisti 0.796 0.748 467 1342 1001	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale	0.966 0.748 4.898 1.567 1668 3.014 1.14 43.89
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.796 0.748 467 1342 1001	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale	0.966 0.748 4.898 1.567 1668 3.014 1.14 43.89 84.66
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.796 0.748 467 1342 1001	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale  95% t UCL	0.966 0.748 4.898 1.567 1668 3.014 1.14 43.89 84.66 77.57
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.796 0.748 467 1342 1001	Assuming Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  95% t UCL  95% Percentile Bootstrap UCL	4.898 1.567 1668 3.014 1.14 43.89 84.66 77.57
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.796 0.748 467 1342 1001	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale  95% t UCL	0.966 0.748 4.898

Gamma Distribution Test with Detected Values Only	,	Data Distribution Test with Detected Values Only		
	0.353			
k star (bias corrected) Theta Star	365.1	Data appear Normal at 5% Significance Level		
	2.825			
nu star	2.825			
A-D Test Statistic	0.301	Nonparametric Statistics		
5% A-D Critical Value	0.67	Kaplan-Meier (KM) Method		
K-S Test Statistic	0.67	Mean	57.	
5% K-S Critical Value	0.405	SD	88.	
Data appear Gamma Distributed at 5% Significance Le	evel	SE of Mean	29.	
		95% KM (t) UCL	109	
Assuming Gamma Distribution		95% KM (z) UCL	10	
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	10	
Minimum	0.000001	95% KM (bootstrap t) UCL	11:	
Maximum	380	95% KM (BCA) UCL	3	
Mean	47.76	95% KM (Percentile Bootstrap) UCL	14:	
Median	0.718	95% KM (Chebyshev) UCL	18	
SD	91.34	97.5% KM (Chebyshev) UCL	24	
k star	0.123	99% KM (Chebyshev) UCL	35	
Theta star	388.9			
Nu star	4.666	Potential UCLs to Use		
AppChi2	1.001	95% KM (t) UCL	10	
95% Gamma Approximate UCL (Use when n >= 40)	222.6	95% KM (Percentile Bootstrap) UCL	14:	
95% Adjusted Gamma UCL (Use when n < 40)	N/A			
DL/2 is not a recommended method.				
Note: Suggestions regarding the selection of a 95%	UCL are pro	vided to help the user to select the most appropriate 95% UCL.		
		ulation studies summarized in Singh, Maichle, and Lee (2006).		
For additional insigh	t, the user m	ay want to consult a statistician.		

	General Stat		
Number of Valid Data	19	Number of Detected Data	
Number of Distinct Detected Data	17	Number of Non-Detect Data	
		Percent Non-Detects	10.53
Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.41	Minimum Detected	0.
Maximum Detected	10.85	Maximum Detected	2.3
Mean of Detected	5.064	Mean of Detected	1.5
SD of Detected	2.521	SD of Detected	0.4
Minimum Non-Detect	2.9	Minimum Non-Detect	1.0
Maximum Non-Detect	3.3	Maximum Non-Detect	1.
e: Data have multiple DLs - Use of KM Method is recommen	ded	Number treated as Non-Detect	
all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	
ervations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	31.5
-	LICI Ctatio	N	
Normal Distribution Test with Detected Values Only	UCL Statis	tics Lognormal Distribution Test with Detected Values Onl	.,
Shapiro Wilk Test Statistic	0.847	Shapiro Wilk Test Statistic	<b>y</b> 0.9
5% Shapiro Wilk Critical Value	0.892	5% Shapiro Wilk Critical Value	0.0
Data not Normal at 5% Significance Level	0.032	Data appear Lognormal at 5% Significance Level	0.
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.694	Mean	1.
SD OFF(CRITICAL PLACE)	2.623 5.738	SD STORY II Coast (DL/2) LIGH	0. 6.
95% DL/2 (t) UCL	5.738	95% H-Stat (DL/2) UCL	0.
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	4.351	Mean in Log Scale	1.
SD	3.025	SD in Log Scale	0.
95% MLE (t) UCL	5.554	Mean in Original Scale	4.
95% MLE (Tiku) UCL	5.63	SD in Original Scale	2.
		95% t UCL	5.
		95% Percentile Bootstrap UCL	5.
		95% BCA Bootstrap UCL 95% H UCL	5. 5.
		95% H UCL	ე.
Gamma Distribution Test with Detected Values Only	/	Data Distribution Test with Detected Values Only	
k star (bias corrected)	4.243	Data appear Gamma Distributed at 5% Significance Lev	vel
Theta Star	1.193		
nu star	144.3		
A-D Test Statistic	0.534	Nonparametric Statistics	
5% A-D Critical Value	0.741	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.741	Mean	4.
5% K-S Critical Value	0.21	SD	2
Data appear Gamma Distributed at 5% Significance Le	evel	SE of Mean	0.
		95% KM (t) UCL	5.
Assuming Gamma Distribution		95% KM (z) UCL	5.
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	5
Minimum	1.707	95% KM (bootstrap t) UCL	6
Maximum	10.85	95% KM (BCA) UCL	5.
Mean	4.735	95% KM (Percentile Bootstrap) UCL	5
Median	4.5	95% KM (Chebyshev) UCL	7.
SD k stor	2.575	97.5% KM (Chebyshev) UCL	8.
k star	3.53 1.341	99% KM (Chebyshev) UCL	1
Theta star Nu star	1.341	Potential UCLs to Use	
AppChi2	134.1	95% KM (BCA) UCL	5
95% Gamma Approximate UCL (Use when n >= 40)	5.86	33 % KIVI (BCA) UCL	<u> </u>
95% Adjusted Gamma UCL (Use when n < 40)	5.971		
	0.07.1		
e: DL/2 is not a recommended method			
e: DL/2 is not a recommended method.		ed to help the user to select the most appropriate 95% UCL.	

	General Stat	istics	
Number of Valid Data	19	Number of Detected Data	17
Number of Distinct Detected Data	17	Number of Non-Detect Data	
		Percent Non-Detects	10.53%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	5.2	Minimum Detected	1.64
Maximum Detected	24.1	Maximum Detected	3.18
Mean of Detected	9.372	Mean of Detected	2.15
SD of Detected	4.643	SD of Detected	0.39
Minimum Non-Detect	6.5	Minimum Non-Detect	1.87
Maximum Non-Detect	6.9	Maximum Non-Detect	1.93
lote: Data have multiple DLs - Use of KM Method is recommend	ded	Number treated as Non-Detect	
or all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	36.84
	1101 04-4	· · · · · · · · · · · · · · · · · · ·	
Normal Distribution Test with Detected Values Only	UCL Statis	Lognormal Distribution Test with Detected Values Only	.,
Shapiro Wilk Test Statistic	0.74	Shapiro Wilk Test Statistic	<b>y</b> 0.90
5% Shapiro Wilk Critical Value	0.892	5% Shapiro Wilk Critical Value	0.89
Data not Normal at 5% Significance Level	0.002	Data appear Lognormal at 5% Significance Level	0.00
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method	8.738	DL/2 Substitution Method	2.05
Mean SD	4.771	Mean SD	0.47
95% DL/2 (t) UCL	10.64	95% H-Stat (DL/2) UCL	10.9
· · ·	10.04		10.5
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	7.77	Mean in Log Scale	2.10
SD	5.783	SD in Log Scale	0.39
95% MLE (t) UCL	10.07	Mean in Original Scale	8.94
95% MLE (Tiku) UCL	10.29	SD in Original Scale	4.5
		95% t UCL 95% Percentile Bootstrap UCL	10.7
		95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	10.7 11.
		95% H UCL	10.6
		-	10.0
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	5.156	Data appear Lognormal at 5% Significance Level	
Theta Star	1.818		
nu star	175.3		
A-D Test Statistic	0.851	Nonparametric Statistics	
5% A-D Critical Value	0.741	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.741	Mean	8.9
5% K-S Critical Value	0.21	SD	4.41
Data not Gamma Distributed at 5% Significance Leve		SE of Mean	1.04
,		95% KM (t) UCL	10.7
Assuming Gamma Distribution		95% KM (z) UCL	10.
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	10.7
Minimum	4.028	95% KM (bootstrap t) UCL	12.
Maximum	24.1	95% KM (BCA) UCL	10.8
Mean	8.88	95% KM (Percentile Bootstrap) UCL	10.7
Median	7.8	95% KM (Chebyshev) UCL	13.5
SD Is about	4.623	97.5% KM (Chebyshev) UCL	15.
k star Theta star	4.663 1.904	99% KM (Chebyshev) UCL	19.3
Nu star	1.904	Potential UCLs to Use	
AppChi2	147.4	95% KM (Chebyshev) UCL	13.5
95% Gamma Approximate UCL (Use when n >= 40)	10.67	55 % Tan (Globyshov) GGE	
95% Adjusted Gamma UCL (Use when n < 40)	10.85		
ote: DL/2 is not a recommended method.			
Note: Cuggostians regarding the coloration of - OFO/ I		ed to help the user to select the most appropriate 95% UCL.	

	General Statis	stics	
Number of Valid Data	19	Number of Detected Data	17
Number of Distinct Detected Data	16	Number of Non-Detect Data	:
		Percent Non-Detects	10.53%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.6	Minimum Detected	0.95
Maximum Detected	14.7	Maximum Detected	2.68
Mean of Detected	7.025	Mean of Detected	1.85
SD of Detected	3.022	SD of Detected	0.45
Minimum Non-Detect	3.5	Minimum Non-Detect	1.25
Maximum Non-Detect	4.6	Maximum Non-Detect	1.52
Note: Data have multiple DLs - Use of KM Method is recommendate.	ded	Number treated as Non-Detect	
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	36.849
	UCL Statist		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Test Statistic	0.95
5% Shapiro Wilk Critical Value	0.892	5% Shapiro Wilk Critical Value	0.89
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	6.498	Mean	1.73
SD	3.258	SD	0.56
95% DL/2 (t) UCL	7.794	95% H-Stat (DL/2) UCL	8.76
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	6.054	Mean in Log Scale	1.79
SD	3.806	SD in Log Scale	0.47
95% MLE (t) UCL	7.568	Mean in Original Scale	6.64
95% MLE (Tiku) UCL	7.733	SD in Original Scale	3.07
		95% t UCL	7.86
		95% Percentile Bootstrap UCL	7.79
		95% BCA Bootstrap UCL	7.91
		95% H UCL	8.36
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected) Theta Star	4.679 1.501	Data appear Normal at 5% Significance Level	
nu star	159.1		
A-D Test Statistic	0.406	Nonparametric Statistics	
5% A-D Critical Value	0.741	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.741	Mean	6.63
5% K-S Critical Value	0.21	SD	3.00
Data appear Gamma Distributed at 5% Significance Le	vei	SE of Mean	0.71
		95% KM (t) UCL	7.86
Accuming Commo Distribution		95% KM (z) UCL 95% KM (jackknife) UCL	7.80
Assuming Gamma Distribution			7.86
Gamma ROS Statistics using Extrapolated Data	1 7/5		0 06
Gamma ROS Statistics using Extrapolated Data Minimum	1.745	95% KM (bootstrap t) UCL	8.06
Gamma ROS Statistics using Extrapolated Data Minimum Maximum	14.7	95% KM (bootstrap t) UCL 95% KM (BCA) UCL	7.77
Gamma ROS Statistics using Extrapolated Data Minimum Maximum Mean	14.7 6.567	95% KM (bootstrap t) UCL 95% KM (BCA) UCL 95% KM (Percentile Bootstrap) UCL	7.77 7.81
Gamma ROS Statistics using Extrapolated Data Minimum Maximum Mean Median	14.7 6.567 6.42	95% KM (bootstrap t) UCL 95% KM (BCA) UCL 95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL	7.77 7.81 9.7
Gamma ROS Statistics using Extrapolated Data Minimum Maximum Mean Median SD	14.7 6.567 6.42 3.178	95% KM (bootstrap t) UCL 95% KM (BCA) UCL 95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL	7.77 7.81 9.7 11.0
Gamma ROS Statistics using Extrapolated Data Minimum Maximum Mean Median SD k star	14.7 6.567 6.42 3.178 3.599	95% KM (bootstrap t) UCL 95% KM (BCA) UCL 95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL	7.77 7.81 9.7
Gamma ROS Statistics using Extrapolated Data Minimum Maximum Mean Median SD	14.7 6.567 6.42 3.178 3.599 1.825	95% KM (bootstrap t) UCL 95% KM (BCA) UCL 95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL	7.77 7.81 9.7 11.0
Gamma ROS Statistics using Extrapolated Data Minimum Maximum Mean Median SD k star Theta star	14.7 6.567 6.42 3.178 3.599	95% KM (bootstrap t) UCL 95% KM (BCA) UCL 95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL	7.77 7.81 9.7 11.0 13.7
Gamma ROS Statistics using Extrapolated Data Minimum Maximum Mean Median SD k star Theta star Nu star AppChi2	14.7 6.567 6.42 3.178 3.599 1.825 136.7 110.7	95% KM (bootstrap t) UCL 95% KM (BCA) UCL 95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use 95% KM (t) UCL	7.77 7.81 9.7 11.0 13.7
Gamma ROS Statistics using Extrapolated Data  Minimum  Maximum  Mean  Median  SD  k star  Theta star  Nu star  AppChi2  95% Gamma Approximate UCL (Use when n >= 40)	14.7 6.567 6.42 3.178 3.599 1.825 136.7 110.7 8.11	95% KM (bootstrap t) UCL 95% KM (BCA) UCL 95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL	7.77 7.81 9.7 11.0 13.7
Gamma ROS Statistics using Extrapolated Data Minimum Maximum Mean Median SD k star Theta star Nu star AppChi2	14.7 6.567 6.42 3.178 3.599 1.825 136.7 110.7	95% KM (bootstrap t) UCL 95% KM (BCA) UCL 95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use 95% KM (t) UCL	7.77 7.81 9.7 11.0
Gamma ROS Statistics using Extrapolated Data  Minimum  Maximum  Mean  Median  SD  k star  Theta star  Nu star  AppChi2  95% Gamma Approximate UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Note: DL/2 is not a recommended method.	14.7 6.567 6.42 3.178 3.599 1.825 136.7 110.7 8.11 8.262	95% KM (bootstrap t) UCL 95% KM (BCA) UCL 95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use 95% KM (t) UCL	7.77 7.81 9.7 11.0 13.7

	CL Statistics f	or Full Data Se	ets	
User Selected Options		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	11. 10. 6 Et 10:14	147 :
	olders\Projects	s\Newport\Dere	ecktor\Draft Final Risk Assessment\EPCs\Surface Soil - North	Water
Full Precision OFF				
Confidence Coefficient 95%				
Number of Bootstrap Operations 2000				
LUMINUM				
		General S	tatistics	
Number of Valid	Observations		Number of Distinct Observations	18
Raw Statistics			Log-transformed Statistics	
Tav Janou	Minimum	3440	Minimum of Log Data	8 143
	Maximum		Maximum of Log Data	
	Mean		Mean of log Data	
Ge	ometric Mean		SD of log Data	
	Median		05 01 log 5 d.u.	0.007
		1896		
Std.	Error of Mean			
	nt of Variation			
	Skewness			
		Relevant UCI	Statistics	
Normal Distribution Te	st	Troiovant COL	Lognormal Distribution Test	
	Test Statistic	0.867	Shapiro Wilk Test Statistic	0.932
	Critical Value		Shapiro Wilk Critical Value	
Data not Normal at 5% Significa			Data appear Lognormal at 5% Significance Level	0.001
Assuming Normal Distribu			Assuming Lognormal Distribution	
	tudent's-t UCL	6441	95% H-UCL	
95% UCLs (Adjusted for Sk			95% Chebyshev (MVUE) UCL	7437
95% Adjusted-CLT UCL			97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (J	ohnson-19/8)	6459	99% Chebyshev (MVUE) UCL	9/01
Gamma Distribution Te	est		Data Distribution	
k star (b	ias corrected)	9.138	Data appear Gamma Distributed at 5% Significance Le	evel
·	Theta Star	622.3	· ·	
	MLE of Mean	5687		
MLE of Stand	dard Deviation	1881		
	nu star	347.2		
Approximate Chi Squa	re Value (.05)	305	Nonparametric Statistics	
Adjusted Level of	of Significance	0.0369	95% CLT UCL	
Adjusted Chi	Square Value	301.6	95% Jackknife UCL	
			95% Standard Bootstrap UCL	
Anderson-Darling			95% Bootstrap-t UCL	
Anderson-Darling 5%			95% Hall's Bootstrap UCL	
Kolmogorov-Smirnov			95% Percentile Bootstrap UCL	
			95% BCA Bootstrap UCL	
Kolmogorov-Smirnov 5%	O 10 1	.evel	95% Chebyshev(Mean, Sd) UCL	
Kolmogorov-Smirnov 5%  Data appear Gamma Distributed at 5%	Significance L		97.5% Chebyshev(Mean, Sd) UCL	
Data appear Gamma Distributed at 5%				10014
Data appear Gamma Distributed at 5%  Assuming Gamma Distrib	ution		99% Chebyshev(Mean, Sd) UCL	
Data appear Gamma Distributed at 5%  Assuming Gamma Distrib  95% Approximate Gamma UCL (Use v	ution when n >= 40)	6473	99% Chebyshev(Mean, Sd) UCL	
Data appear Gamma Distributed at 5%  Assuming Gamma Distrib	ution when n >= 40)	6473	99% Chebyshev(Mean, Sd) UCL	
Data appear Gamma Distributed at 5%  Assuming Gamma Distrib  95% Approximate Gamma UCL (Use v	ution when n >= 40) when n < 40)	6473	99% Chebyshev(Mean, Sd) UCL Use 95% Approximate Gamma UCL	
Data appear Gamma Distributed at 5%  Assuming Gamma Distrib  95% Approximate Gamma UCL (Use v 95% Adjusted Gamma UCL (Use  Potential UCL to Use	ution when n >= 40) when n < 40)	6473	Use 95% Approximate Gamma UCL	6473
Data appear Gamma Distributed at 5%  Assuming Gamma Distrib  95% Approximate Gamma UCL (Use of 95% Adjusted Gamma UCL (Use o	ution when n >= 40) when n < 40) continuous	6473 6547 6 UCL are prov	Use 95% Approximate Gamma UCL	6473
Data appear Gamma Distributed at 5%  Assuming Gamma Distrib  95% Approximate Gamma UCL (Use of the second of the s	ution when n >= 40) when n < 40) control of a 95% d upon the res	6473 6547 6 UCL are provents of the sim	Use 95% Approximate Gamma UCL	6473

	General	
Number of Valid Observations	19	Number of Distinct Observations   17
Raw Statistics		Log-transformed Statistics
Minimum	11200	Minimum of Log Data 9.324
Maximum		Maximum of Log Data 10.21
Mean	15774	Mean of log Data 9.638
Geometric Mean	15338	SD of log Data 0.238
Median	15400	-
	4043	
Std. Error of Mean	927.5	
Coefficient of Variation	0.256	
Skewness	1.233	
	Relevant U	CL Statistics
Normal Distribution Test		Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.88	Shapiro Wilk Test Statistic 0.93
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value 0.901
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	17382	95% H-UCL 1745
95% UCLs (Adjusted for Skewness)	1.7002	95% Chebyshev (MVUE) UCL 1953
95% Adjusted-CLT UCL (Chen-1995)	17579	97.5% Chebyshev (MVUE) UCL 21170
95% Modified-t UCL (Johnson-1978)	17426	99% Chebyshev (MVUE) UCL 2438
,		
Gamma Distribution Test		Data Distribution
k star (bias corrected)		Data appear Gamma Distributed at 5% Significance Level
Theta Star		
MLE of Mean		
MLE of Standard Deviation		
nu star		
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 1729
Adjusted Chi Square Value	518.3	95% Jackknife UCL 1738
Andrew Device Test Obstictie	0.545	95% Standard Bootstrap UCL 1727
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 1776
Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic		95% Hall's Bootstrap UCL 1813 95% Percentile Bootstrap UCL 1737
Kolmogorov-Smirnov 7est Statistic  Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 1748
Data appear Gamma Distributed at 5% Significance L		95% Chebyshev(Mean, Sd) UCL 1981
Data appear Garrina Distributed at 5% Significance L	.evei	97.5% Chebyshev(Mean, Sd) UCL 2156
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 2500
95% Approximate Gamma UCL (Use when n >= 40)	17425	55 % Shebyshev (Weart, Su) 555 2555
95% Adjusted Gamma UCL (Use when n < 40)		
Potential UCL to Use		Use 95% Approximate Gamma UCL 1742
, statistic oct to doo		200 00 % Approximate damina OOL 1742
		ovided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the res		mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.

N 1 (V/1:10)		Statistics	
Number of Valid Observations	19	Number of Distinct Observations 18	
Raw Statistics		Log-transformed Statistics	
Minimum	81.4	Minimum of Log Data 4.399	
Maximum		Maximum of Log Data 5.829	
	210.7	Mean of log Data 5.251	
Geometric Mean		SD of log Data 0.474	
Median			
	91.52		
Std. Error of Mean			
Coefficient of Variation			
Skewness	0.163		
Normal Bladdon's Tool	Relevant L	ICL Statistics	
Normal Distribution Test	0.000	Lognormal Distribution Test	
Shapiro Wilk Test Statistic Shapiro Wilk Critical Value		Shapiro Wilk Test Statistic 0.91 Shapiro Wilk Critical Value 0.901	
Data not Normal at 5% Significance Level	0.901	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	247.1	95% H-UCL 266.2	
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 315.6	
95% Adjusted-CLT UCL (Chen-1995)	246.1	97.5% Chebyshev (MVUE) UCL 360.4	
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL 448.5	
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4 389	Data appear Gamma Distributed at 5% Significance Level	
Theta Star		Data appear damma Dioanbatoa at 070 digitimoanoo E0701	
MLE of Mean			
MLE of Standard Deviation			
nu star			
Approximate Chi Square Value (.05)		Nonparametric Statistics	
Adjusted Level of Significance		95% CLT UCL 245.2	
Adjusted Chi Square Value		95% Jackknife UCL 247.1	
, ,		95% Standard Bootstrap UCL 244.8	
Anderson-Darling Test Statistic	0.664	95% Bootstrap-t UCL 247.8	
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 243.7	
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 244.7	
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 246.4	
Data appear Gamma Distributed at 5% Significance L		95% Chebyshev(Mean, Sd) UCL 302.2	
		97.5% Chebyshev(Mean, Sd) UCL 341.8	
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 419.6	
95% Approximate Gamma UCL (Use when n >= 40)			
95% Adjusted Gamma UCL (Use when n < 40)	259.1		
Potential LICL to Line		Use 95% Approximate Gamma UCL 254.8	
Potential UCL to Use		Ose 35 % Approximate Gamina OCL 254.8	
		111111111111111111111111111111111111111	
Note: Suggestions regarding the selection of a 95%			
		rovided to help the user to select the most appropriate 95% UCL. imulation studies summarized in Singh, Singh, and laci (2002)	

**North Waterfront** 

**Subsurface Soil** 

	General UCL Statistics for	r Data Sets	with Non-Detects	
User Selected Options				
From File		Newport\De	recktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - No	rth Waterfro
Full Precision Confidence Coefficient	OFF 95%			
Number of Bootstrap Operations	2000			
Number of Bootstrap Operations	2000			
DENZO/ANDVDENE				
BENZO(A)PYRENE				
		General S	Statistics	
	Number of Valid Data	21	Number of Detected Data	2
	of Distinct Detected Data	2	Number of Non-Detect Data	19
N	lumber of Missing Values	12	Percent Non-Detects	90.48%
Raw S	tatistics		Log-transformed Statistics	
	Minimum Detected	23.3	Minimum Detected	3.148
	Maximum Detected	44	Maximum Detected	3.784
	Mean of Detected	33.65	Mean of Detected	3.466
	SD of Detected	14.64	SD of Detected	0.45
	Minimum Non-Detect	3.42	Minimum Non-Detect	1.23
	Maximum Non-Detect	11000	Maximum Non-Detect	9.306
Note: Data have multiple DLs - Use of	of KM Method is recommen	ded	Number treated as Non-Detect	21
For all methods (except KM, DL/2, ar		uou	Number treated as Non-Detect	0
Observations < Largest ND are treate			Single DL Non-Detect Percentage	100.00%
	Warning: Data s	et has only	2 Distinct Detected Values.	
The Project Team may of Unless Data Q	ot be adequate enough to only the decide to use alternative site uality Objectives (DQOs) had been seen as a second of the decided of the dec	compute me te specific va nave been m	2 Distinct Detected Values. aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.	
The Project Team may of Unless Data Q	ot be adequate enough to of lecide to use alternative sit ruality Objectives (DQOs) hat tected data may not be ade Those methods will It is necessary to have 4	compute me te specific va nave been me equate enou return a 'N// or more Dis	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.	
The Project Team may of Unless Data Quantum The number of details	ot be adequate enough to of lecide to use alternative sit reality Objectives (DQOs) have tected data may not be ade Those methods will to snecessary to have 4 However, results obtained	compute me te specific van nave been me equate enou return a 'N// or more Dis d using 4 to	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.	
The Project Team may of Unless Data Quantum The number of details	ot be adequate enough to of lecide to use alternative sit reality Objectives (DQOs) have tected data may not be ade Those methods will to snecessary to have 4 However, results obtained	compute me te specific van nave been me equate enou return a 'N// or more Dis d using 4 to	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.	
The Project Team may of Unless Data Quantum The number of details	ot be adequate enough to of lecide to use alternative sit reality Objectives (DQOs) have tected data may not be ade Those methods will to snecessary to have 4 However, results obtained	compute me te specific vanave been me equate enou return a 'N// or more Dis d using 4 to e observation	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  etinct Values for bootstrap methods.  9 distinct values may not be reliable.  ins for accurate and meaningful results and estimates.	
The Project Team may of Unless Data Quantity The number of determined the second secon	ot be adequate enough to of lecide to use alternative situality Objectives (DQOs) hat tected data may not be ade Those methods will lit is necessary to have 4 However, results obtained and to have 10 to 15 or more	compute medic specific variate been medicate enough return a 'N// or more Discussing 4 to be observation	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  etinct Values for bootstrap methods.  9 distinct values may not be reliable.  ens for accurate and meaningful results and estimates.  atistics	lv
The Project Team may of Unless Data Quality The number of details and the second secon	ot be adequate enough to decide to use alternative situality Objectives (DQOs) had tected data may not be ade Those methods will  It is necessary to have 4 However, results obtained and to have 10 to 15 or more with Detected Values Only	compute medic specific variate been medicate enough return a 'N// or more Discussing 4 to be observation	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  In some for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values On	
The Project Team may of Unless Data Quantum The number of determined by the It is recommended in Normal Distribution Test in State of the Item Team of the Item Team Item Item Item Item Item Team Item Item Item Item Item Item Item Ite	ot be adequate enough to of lecide to use alternative situality Objectives (DQOs) hat tected data may not be ade Those methods will lit is necessary to have 4 However, results obtained and to have 10 to 15 or more	compute medic specific variate been medicate enough return a 'N// or more Discussing 4 to be observation	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  etinct Values for bootstrap methods.  9 distinct values may not be reliable.  ens for accurate and meaningful results and estimates.  atistics	ly N/A N/A
The Project Team may of Unless Data Quantum The number of determined by the It is recommended by	ot be adequate enough to of lecide to use alternative situality Objectives (DQOs) hat tected data may not be ade Those methods will be a lecide to have 10 to 15 or more with Detected Values Only Shapiro Wilk Test Statistic	compute medic specific variate been medicate enough return a 'N// or more Discussing 4 to be observation to the control of the	aningful and reliable test statistics and estimates.  alues to estimate environmental parameters (e.g., EPC, BTV).  att, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic	N/A
The Project Team may of Unless Data Quality of details and the number of details are commended.  It is recommended to see the	ot be adequate enough to of lecide to use alternative situality Objectives (DQOs) hat tected data may not be ade Those methods will.  It is necessary to have 4 However, results obtained and to have 10 to 15 or more with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value 5% Significance Level	compute medic specific variate been medicate enough return a 'N// or more Discussing 4 to be observation to the control of the	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  Ins for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level	N/A
The Project Team may of Unless Data Quality of detection of detection of the Normal Distribution Test of Society of Socie	ot be adequate enough to of lecide to use alternative situality Objectives (DQOs) hat tected data may not be ade Those methods will.  It is necessary to have 4 However, results obtained and to have 10 to 15 or more with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value 5% Significance Level mal Distribution	compute medic specific variate been medicate enough return a 'N// or more Discussing 4 to be observation to the control of the	aningful and reliable test statistics and estimates.  alues to estimate environmental parameters (e.g., EPC, BTV).  alues to estimate environmental parameters (e.g., EPC, BTV).  alues to estimate environmental parameters (e.g., EPC, BTV).  alues to estimate environmental parameters (e.g., EPC, BTV).  alues to estimate to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A
The Project Team may of Unless Data Qualified The number of details and the It is recommended to	ot be adequate enough to of lecide to use alternative situality Objectives (DQOs) hat tected data may not be ade Those methods will.  It is necessary to have 4 However, results obtained and to have 10 to 15 or more with Detected Values Only Chapiro Wilk Test Statistic hapiro Wilk Critical Value (SW Significance Level)  mal Distribution  DL/2 Substitution Method	compute medic specific value been medicate enough return a 'N/// or more Discussing 4 to be observation  UCL St  N/A  N/A	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  atet, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  In some for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	N/A N/A
The Project Team may of Unless Data Qualified The number of details and the It is recommended to	ot be adequate enough to of lecide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decided at a may not be adea those methods will.  It is necessary to have 4 However, results obtained and to have 10 to 15 or more decided to have 10 to 15 or more decided with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value of Significance Level decided and Distribution DL/2 Substitution Method Mean	compute medic specific variate specific variate enough return a 'N// or more Discussing 4 to a observation UCL St.  N/A N/A N/A 399.6	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  atet, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean	N/A N/A 4.56
The Project Team may of Unless Data Qualified The number of details and the It is recommended to	ot be adequate enough to of lecide to use alternative situality Objectives (DQOs) hat tected data may not be ade Those methods will.  It is necessary to have 4 However, results obtained and to have 10 to 15 or more with Detected Values Only Chapiro Wilk Test Statistic hapiro Wilk Critical Value (SW Significance Level)  mal Distribution  DL/2 Substitution Method	compute medic specific value been medicate enough return a 'N/// or more Discussing 4 to be observation  UCL St  N/A  N/A	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  atet, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  In some for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	N/A N/A 4.56 1.92
The Project Team may of Unless Data Quantum The number of determined It is recommended Normal Distribution Test Substitu	ot be adequate enough to of lecide to use alternative site reality Objectives (DQOs) have tected data may not be adea Those methods will.  It is necessary to have 4 However, results obtained and to have 10 to 15 or more with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value SW Significance Level  mal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	compute medie specific variate specific variate enouge equate enouge equate enouge equate enouge equate enouge eno	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  atet, it is suggested to collect additional observations.  agh to perform GOF tests, bootstrap, and ROS methods.  A value on your output display!  atinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL	N/A N/A 4.56 1.92
The Project Team may of Unless Data Qualified The number of detection of the It is recommended.  Normal Distribution Test of Substituti	ot be adequate enough to of decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to decide and not be adea of those methods will.  It is necessary to have 4 However, results obtained to have 10 to 15 or more decided to ha	compute medic specific variates been made been medicate enough return a 'N// or more Discussing 4 to be observation  UCL St  N/A  N/A  N/A  399.6  1171	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  atet, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  Ins for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method	N/A N/A 4.56 1.92 3370
The Project Team may of Unless Data Qualified The number of detection of the It is recommended.  Normal Distribution Test of Substituti	ot be adequate enough to of lecide to use alternative site reality Objectives (DQOs) have tected data may not be adea Those methods will.  It is necessary to have 4 However, results obtained and to have 10 to 15 or more with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value SW Significance Level  mal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	compute medie specific variate specific variate enouge equate enouge equate enouge equate enouge equate enouge eno	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  atet, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  Ins for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale	N/A N/A 4.56 1.92 3370
The Project Team may of Unless Data Qualified The number of detection of the It is recommended.  Normal Distribution Test of Substituti	ot be adequate enough to of decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to decide and not be adea of those methods will.  It is necessary to have 4 However, results obtained to have 10 to 15 or more decided to ha	compute medie specific variate specific variate enouge equate enouge equate enouge equate enouge equate enouge et urn a 'N////// or more Disciplification of using 4 to be observation uCL Standard N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  atet, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  Ins for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale	N/A N/A 4.56 1.92 3370 N/A N/A
The Project Team may of Unless Data Qualified The number of detection of the It is recommended.  Normal Distribution Test of Substituti	ot be adequate enough to of decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to decide and not be adea of those methods will.  It is necessary to have 4 However, results obtained to have 10 to 15 or more decided to ha	compute medie specific variate specific variate enouge equate enouge equate enouge equate enouge equate enouge et urn a 'N////// or more Disciplification of using 4 to be observation uCL Standard N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  alues to estimate environmental environmental environmental environmental environmental environmental environmental environmental environmental environmental environmental environmental environmental environmental environmental environmental environmental e	N/A N/A 4.56 1.92 3370 N/A N/A N/A
The Project Team may of Unless Data Quality of detection of detection of the Normal Distribution Test of Substitut	ot be adequate enough to of decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to decide and not be adea of those methods will.  It is necessary to have 4 However, results obtained to have 10 to 15 or more decided to ha	compute medie specific variate specific variate enouge equate enouge equate enouge equate enouge equate enouge et urn a 'N////// or more Disciplification of using 4 to be observation uCL Standard N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  atet, it is suggested to collect additional observations.  agh to perform GOF tests, bootstrap, and ROS methods.  A value on your output display!  attinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  SD in Original Scale	N/A N/A 4.56 1.92 3370 N/A N/A N/A
The Project Team may of Unless Data Quality of detection of detection of the Normal Distribution Test of Substitut	ot be adequate enough to of decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to decide and not be adea of those methods will.  It is necessary to have 4 However, results obtained to have 10 to 15 or more decided to ha	compute medie specific variate specific variate enouge equate enouge equate enouge equate enouge equate enouge et urn a 'N////// or more Disciplification of using 4 to be observation uCL Standard N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  atet, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  as for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Coriginal Scale SD in Original Scale SD in Original Scale	N/A N/A 4.56 1.92 3370 N/A N/A N/A N/A
The Project Team may of Unless Data Quality of detection of detection of the Normal Distribution Test of Substitut	ot be adequate enough to of decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to decide and not be adea of those methods will.  It is necessary to have 4 However, results obtained to have 10 to 15 or more decided to ha	compute medie specific variate specific variate enouge equate enouge equate enouge equate enouge equate enouge et urn a 'N////// or more Disciplification of using 4 to be observation uCL Standard N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  atet, it is suggested to collect additional observations.  agh to perform GOF tests, bootstrap, and ROS methods.  A value on your output display!  attinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  SD in Original Scale	N/A N/A 4.56 1.92 3370 N/A N/A N/A

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A	· · · · · · · · · · · · · · · · · · ·	
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Test Statistic	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	27.44
5% K-S Critical Value	N/A	SD SD	8.28
Data not Gamma Distributed at 5% Significance Level		SE of Mean	5.237
Data not Gamma Distributed at 5% Significance Level		95% KM (t) UCL	36.47
Assuming Gamma Distribution		95% KM (z) UCL	36.05
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	40.97
Minimum	N/A	95% KM (bootstrap t) UCL	32.22
Maximum	N/A	95% KM (BCA) UCL	44
Mean	N/A	95% KM (Percentile Bootstrap) UCL	44
Median	N/A	95% KM (Chebyshev) UCL	50.27
SD	N/A	97.5% KM (Chebyshev) UCL	60.14
k star	N/A	99% KM (Chebyshev) UCL	79.54
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	36.47
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	44
95% Adjusted Gamma UCL (Use when n < 40)	N/A	, ,,	
DL/2 is not a recommended method.	•	·	
		vided to help the user to select the most appropriate 95% UCL.	
These recommendations are based upon the results	of the simu	ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight,	the user m	ay want to consult a statistician.	

DIBENZO(A,H)ANTHRACENE			
DIBENZO(A, II) ANTI HACENE			
	General	Statistics	
Number of Valid Data	21	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	20
Number of Missing Values	12	Percent Non-Detects	95.24%
		or any other software) should not be used on such a data set! Project Team to estimate environmental parameters (e.g., EPC	DΤ\Λ
it is suggested to use alternative site specific values detern	illieu by tile	Project Team to esumate environmental parameters (e.g., EPC	, ві <i>у)</i> .
The data set for variable D	IBENZO(A.	H)ANTHRACENE was not processed!	
***************************************	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
COBALT			
	0	04-41-41	
Number of Valid Data	General 39	Number of Detected Data	33
Number of Distinct Detected Data	32	Number of Non-Detect Data	
Number of Distinct Detected Data	32	Percent Non-Detects	15.38%
		Percent Non-Detects	13.36%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	3	Minimum Detected	1.099
Maximum Detected	19.8	Maximum Detected	2.986
Mean of Detected	8.161	Mean of Detected	2.002
SD of Detected	3.816	SD of Detected	0.446
Minimum Non-Detect	2.6	Minimum Non-Detect	0.956
Maximum Non-Detect	3.2	Maximum Non-Detect	1.163
	_		
Note: Data have multiple DLs - Use of KM Method is recommen	nded	Number treated as Non-Detect	7
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	32
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	17.95%
	UCL St		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Onl	
Shapiro Wilk Test Statistic	0.911	Shapiro Wilk Test Statistic	0.986
5% Shapiro Wilk Critical Value	0.931	5% Shapiro Wilk Critical Value	0.931
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	7.131	Mean	1.752
SD	4.273	SD	0.721
95% DL/2 (t) UCL	8.285	95% H-Stat (DL/2) UCL	9.571
(/		7	
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	6.943	Mean in Log Scale	1.848
SD	4.558	SD in Log Scale	0.5
95% MLE (t) UCL	8.173	Mean in Original Scale	7.327
95% MLE (Tiku) UCL	8.192	SD in Original Scale	4.02
		95% t UCL	8.414
		95% Percentile Bootstrap UCL	8.426
		95% BCA Bootstrap UCL	8.449
		95% H UCL	8.79

DIBENZO(A,H)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Onl	M.	Data Distribution Test with Detected Values Only	
k star (bias corrected)	4.824	Data appear Gamma Distributed at 5% Significance Le	رما
Theta Star	1.692	Data appear dannia Distributed at 5% dignificance Le	<i>/</i> CI
nu star	318.4		
na star	010.4		
A-D Test Statistic	0.327	Nonparametric Statistics	
5% A-D Critical Value	0.748	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.748	Mean	7.367
5% K-S Critical Value	0.154	SD	3.927
Data appear Gamma Distributed at 5% Significance Lo	evel	SE of Mean	0.638
•		95% KM (t) UCL	8.444
Assuming Gamma Distribution		95% KM (z) UCL	8.417
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	8.382
Minimum	0.000001	95% KM (bootstrap t) UCL	8.487
Maximum	19.8	95% KM (BCA) UCL	8.6
Mean	6.906	95% KM (Percentile Bootstrap) UCL	8.527
Median	6	95% KM (Chebyshev) UCL	10.15
SD	4.6	97.5% KM (Chebyshev) UCL	11.35
k star	0.287	99% KM (Chebyshev) UCL	13.72
Theta star	24.03		
Nu star	22.42	Potential UCLs to Use	
AppChi2	12.65	95% KM (BCA) UCL	8.6
95% Gamma Approximate UCL (Use when n >= 40)	12.24		
95% Adjusted Gamma UCL (Use when n < 40)	12.52		
Note: DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insigh	t, the user m	ay want to consult a statistician.	

1	ral UCL Statistics f	or Full Data	Sets	
User Selected Options	ands Faldon-\Doos!	-\	weekted Dueft Final Diek Assessment FDO-10 descrife ( O. 1. N.	
	ork Folders\Projects	s\Newport\De	erecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - No	orth Wa
Full Precision OFF				
Confidence Coefficient 95%				
Number of Bootstrap Operations   2000				
UMINUM				
		General	Statistics	
Number of	Valid Observations		Number of Distinct Observations	39
Raw Statistic	<u> </u>		Log-transformed Statistics	
Tuv cutouc	Minimum	2430	Minimum of Log Data	7 796
	Maximum		Maximum of Log Data	
		6424	Mean of log Data	
	Geometric Mean		SD of log Data	
	Median		OD OF log Data (	0.040
		4026		
	Std. Error of Mean			
	fficient of Variation			
	Skewness			
	Skewiless	1.012		
		Relevant UC		
Normal Distributio		10.040	Lognormal Distribution Test	
	Wilk Test Statistic		Shapiro Wilk Test Statistic	
	Wilk Critical Value	0.939	Shapiro Wilk Critical Value	0.939
Data not Normal at 5% Sig	nificance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Di	stribution		Assuming Lognormal Distribution	
	% Student's-t UCL	7511	95% H-UCL	7603
95% UCLs (Adjusted for		1	95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT		7663	97.5% Chebyshev (MVUE) UCL	10049
	CL (Johnson-1978)		99% Chebyshev (MVUE) UCL	
0 51.11.11			D . D	
Gamma Distribution		0.400	Data Distribution	
KS	tar (bias corrected)		Data Follow Appr. Gamma Distribution at 5% Significance	Level
	Theta Star			
ME (	MLE of Mean			
MILE OF	Standard Deviation			
	nu star	-	Norman and Otalists	
	Square Value (.05)		Nonparametric Statistics	7405
	evel of Significance		95% CLT UCL	
Adjusted	l Chi Square Value	206.2	95% Jackknife UCL	
		0.047	95% Standard Bootstrap UCL	
	arling Test Statistic		95% Bootstrap-t UCL	
	g 5% Critical Value		95% Hall's Bootstrap UCL	
Anderson-Darlin		101777	95% Percentile Bootstrap UCL	
Kolmogorov-Sm	irnov Test Statistic			7686
Kolmogorov-Sm Kolmogorov-Smirno	irnov Test Statistic v 5% Critical Value	0.142	95% BCA Bootstrap UCL	~~~=
Kolmogorov-Sm	irnov Test Statistic v 5% Critical Value	0.142	95% Chebyshev(Mean, Sd) UCL	
Kolmogorov-Sm Kolmogorov-Smirno Data follow Appr. Gamma Distribution	nirnov Test Statistic v 5% Critical Value n at 5% Significanc	0.142	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	10451
Kolmogorov-Sm Kolmogorov-Smirno Data follow Appr. Gamma Distribution  Assuming Gamma Di	nirnov Test Statistic v 5% Critical Value n at 5% Significance	0.142 e Level	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	
Kolmogorov-Sm Kolmogorov-Smirno Data follow Appr. Gamma Distribution  Assuming Gamma Di 95% Approximate Gamma UCL (	nirnov Test Statistic v 5% Critical Value n at 5% Significance istribution Use when n >= 40)	0.142 <b>e Level</b> 7510	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	10451
Kolmogorov-Sm Kolmogorov-Smirno Data follow Appr. Gamma Distribution  Assuming Gamma Di	nirnov Test Statistic v 5% Critical Value n at 5% Significance istribution Use when n >= 40)	0.142 <b>e Level</b> 7510	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	10451
Kolmogorov-Sm Kolmogorov-Smirno Data follow Appr. Gamma Distribution  Assuming Gamma Di 95% Approximate Gamma UCL (	irnov Test Statistic v 5% Critical Value n at 5% Significance istribution Use when n >= 40) (Use when n < 40)	0.142 <b>e Level</b> 7510	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	10451 12839
Kolmogorov-Sm Kolmogorov-Smirno Data follow Appr. Gamma Distribution  Assuming Gamma Di  95% Approximate Gamma UCL (  95% Adjusted Gamma UCL  Potential UCL to	innov Test Statistic v 5% Critical Value n at 5% Significance stribution Use when n >= 40) (Use when n < 40)	7510 7556	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL Use 95% Approximate Gamma UCL	10451 12839 7510
Kolmogorov-Sm Kolmogorov-Smirno Data follow Appr. Gamma Distribution  Assuming Gamma Di 95% Approximate Gamma UCL ( 95% Adjusted Gamma UCL  Potential UCL to  Note: Suggestions regarding the	innov Test Statistic v 5% Critical Value n at 5% Significance istribution Use when n >= 40) Use when n < 40) Use when n < 40)	7510 7556	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL  99% Chebyshev(Mean, Sd) UCL  Use 95% Approximate Gamma UCL  ovided to help the user to select the most appropriate 95% UCL	10451 12839 7510
Kolmogorov-Sm Kolmogorov-Smirno Data follow Appr. Gamma Distribution  Assuming Gamma Di 95% Approximate Gamma UCL ( 95% Adjusted Gamma UCL  Potential UCL to  Note: Suggestions regarding the	innov Test Statistic v 5% Critical Value n at 5% Significance istribution Use when n >= 40) Use when n < 40) Use when n < 40)	7510 7556	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL Use 95% Approximate Gamma UCL	10451 12839 7510

		l Statistics
Number of Valid Observations	39	Number of Distinct Observations 32
Raw Statistics		Log-transformed Statistics
Minimum	27	Minimum of Log Data 0.993
Maximum		Maximum of Log Data 0.333
Mean		Mean of log Data 1.670
Geometric Mean		SD of log Data 0.494
Median		
SD	3.526	
Std. Error of Mean	0.565	
Coefficient of Variation	0.579	
Skewness	1.585	
	Relevant l	JCL Statistics
Normal Distribution Test		Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.803	Shapiro Wilk Test Statistic 0.925
Shapiro Wilk Critical Value	0.939	Shapiro Wilk Critical Value 0.939
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	7.041	95% H-UCL 7.038
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 8.186
95% Adjusted-CLT UCL (Chen-1995)	7.171	97.5% Chebyshev (MVUE) UCL 9.12
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL 10.9
Gamma Distribution Test		Data Distribution
k star (bias corrected)	3.709	Data do not follow a Discernable Distribution (0.05)
Theta Star		
MLE of Mean		
MLE of Standard Deviation	3.162	
nu star		
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 7.018
Adjusted Chi Square Value	249.5	95% Jackknife UCL 7.04
A 1 B 11 T . O. 11 1	1.000	95% Standard Bootstrap UCL 7.012
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 7.28
Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic		95% Hall's Bootstrap UCL 7.224 95% Percentile Bootstrap UCL 7.01
Kolmogorov-Smirnov 1est Statistic Kolmogorov-Smirnov 5% Critical Value		95% Percentile Bootstrap OCL 7.01
Data not Gamma Distributed at 5% Significance Lev	0.142 ol	95% Chebyshev(Mean, Sd) UCL 8.55
Data not Gamma Distributed at 5% digitificance Lev	GI	97.5% Chebyshev(Mean, Sd) UCL 9.619
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 11.7
95% Approximate Gamma UCL (Use when n >= 40)	7.021	
95% Adjusted Gamma UCL (Use when n < 40)		
Potential UCL to Use		Use 95% Student's-t UCL 7.04
r oteritial OOL to USE		or 95% Modified-t UCL 7.04
		OI 93 /6 WIOUIIIEU-L OCE 7.003
Note: Suggestions regarding the selection of a 95%		simulation studies summarized in Singh, Singh, and laci (2002)

	General S	Statistics
Number of Valid Observations	39	Number of Distinct Observations 36
Raw Statistics		Log-transformed Statistics
Minimum	2.2	Minimum of Log Data 0.788
Maximum		Maximum of Log Data 3.3
Mean	9.552	Mean of log Data 2.071
Geometric Mean	7.936	SD of log Data 0.624
Median		
	6.042	
Std. Error of Mean		
Coefficient of Variation		
Skewness	1.246	
	Relevant UC	L Statistics
Normal Distribution Test		Lognormal Distribution Test
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic 0.978
Shapiro Wilk Critical Value	0.939	Shapiro Wilk Critical Value 0.939
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	11.18	95% H-UCL 11.82
95% UCLs (Adjusted for Skewness)	'	95% Chebyshev (MVUE) UCL 14.06
95% Adjusted-CLT UCL (Chen-1995)	11.35	97.5% Chebyshev (MVUE) UCL 15.99
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL 19.79
Occurs Distribution Test		Date Blatch store
Gamma Distribution Test  k star (bias corrected)	2.652	Data Distribution Data appear Gamma Distributed at 5% Significance Level
Theta Star		Data appear Gamma Distributed at 5% Significance Level
MLE of Mean		
MLE of Standard Deviation		
nu star		
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 11.14
Adjusted Chi Square Value		95% Jackknife UCL 11.18
, ,		95% Standard Bootstrap UCL 11.13
Anderson-Darling Test Statistic	0.31	95% Bootstrap-t UCL 11.49
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 11.4
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 11.22
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 11.17
Data appear Gamma Distributed at 5% Significance L	evel	95% Chebyshev(Mean, Sd) UCL 13.77
		97.5% Chebyshev(Mean, Sd) UCL 15.59
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 19.18
95% Approximate Gamma UCL (Use when n >= 40)		
95% Adjusted Gamma UCL (Use when n < 40)	11.39	
Potential UCL to Use		Use 95% Approximate Gamma UCL 11.32
		vided to help the user to select the most appropriate 95% UCL.
	uits of the Sin	nulation studies summarized in Singh, Singh, and laci (2002)

Number of Valid Observations   39		General	Statistics
Minimum of Log Data   3.849	Number of Valid Observations	39	Number of Distinct Observations 37
Minimum of Log Data   3.849	Raw Statistics		Log-transformed Statistics
Maximum of Log Data   10.67		6970	
Mean of log Data   9.66			
Geometric Median   15677   SD of log Data   0.477			
Median   16200   SD   9220   Std. Error of Mean   1476   Coefficient of Variation   0.524   Skewness   1.398   Relevant UCL Statistics   Normal Distribution Test   Shapiro Wilk Test Statistic   0.853   Shapiro Wilk Test Statistic   0.961   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Data not Normal at 5% Significance Level   Data appear Lognormal at 5% Significance Level   Data appear Lognormal at 5% Significance Level   Assuming Normal Distribution   Assuming Lognormal Distribution   95% Student's+ UCL   20085   95% Adjusted-CLT UCL (Chen-1995)   20378   97.5% Chebyshev (MVUE) UCL   23635   95% Adjusted-UCL   UCL (Chen-1995)   20378   97.5% Chebyshev (MVUE) UCL   23637   95% Modified+ UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   231378   95% Modified+ UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   231378   95% Modified+ UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   231378   95% Modified+ UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   231378   95% Modified+ UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   231378   95% Modified+ UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   231378   95% Modified+ UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   231378   23140   23			
Std. Error of Mean   1476			65 01 10g 5 d.t. 0.17
Std. Error of Mean   1476     Coefficient of Variation   0.524     Skewness   1.398     Relevant UCL Statistics     Normal Distribution Test   Shapiro Wilk Test Statistic   0.961     Shapiro Wilk Critical Value   0.939     Data not Normal at 5% Significance Level   Data appear Lognormal Distribution     Assuming Normal Distribution   Assuming Lognormal Distribution     Assuming Normal Distribution   Assuming Lognormal Distribution     95% Student's+t UCL   20085   Data appear Lognormal Distribution     95% UCLs (Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   20343     95% UCLs (Adjusted-CLT UCL (Chen-1995)   20378   97.5% Chebyshev (MVUE) UCL   20343     95% Adjusted-CLT UCL (Chen-1995)   20140   99% Chebyshev (MVUE) UCL   20143     95% Modified+ UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   31376     Gamma Distribution Test   Data Distribution     R kstar (bias corrected)   4.161   Theta Star   4229     MILE of Man   17596     MILE of Standard Deviation   8626   nu star   324.6     Approximate Chi Square Value (.05)   283.8   Nonparametric Statistics     Adjusted Che Square Value (.05)   283.8   Nonparametric Statistics     Adjusted Level of Significance   0.0437   95% Clart UCL   20025     Adjusted Che Square Value (.05)   283.8   Nonparametric Statistics     Anderson-Darling Test Statistic   0.004   95% Standard Bootstrap UCL   20045     Anderson-Darling Test Statistic   0.004   95% Bootstrap UCL   20045     Kolmogorov-Smirnov Test Statistic   0.122   95% Percentile Bootstrap UCL   20045     Assuming Gamma Distribution   99% Chebyshev(Mean, Sd) UCL   2031     Assuming Gamma Distribution   99% Chebyshev(Mean, Sd) UCL   2031     Potential UCL to Use   Use 95% Approximate Gamma UCL   2012     95% Approximate Gamma UCL   Use when n < 40)   20229     Potential UCL to Use   Use 95% Approximate Gamma UCL   2012     Potential UCL to Use   Use 95% Approximate Gamma UCL   2012     Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% U			
Relevant UCL Statistics			
Relevant UCL Statistics   Relevant UCL Statistics   Relevant UCL Statistics   Shapiro Wilk Test Statistic   0.853   Shapiro Wilk Test Statistic   0.961   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.934   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.935   Shapiro Wilk Critical Value   0.122   Shapiro Wilk Critical Value   0.122   Shapiro Wilk Critical Value   0.122   Shapiro Wilk Critical Value   0.122   Shapiro Wilk Critical Value			
Normal Distribution Test   Shapiro Wilk Test Statistic   0.853   Shapiro Wilk Test Statistic   0.999   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Data not Normal at 5% Significance Level      Assuming Normal Distribution   95% Student's-t UCL   20085   95% Lobyshev (MVUE) UCL   20343   95% UCLs (Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   20345   95% Adjusted-CLT UCL (Chen-1995)   20378   97.5% Chebyshev (MVUE) UCL   20354   95% Modified-t UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   20354   20140   99% Chebyshev (MVUE) UCL   20354   20140   99% Chebyshev (MVUE) UCL   20354   20140   99% Chebyshev (MVUE) UCL   20145			
Normal Distribution Test   Shapiro Wilk Test Statistic   0.853   Shapiro Wilk Test Statistic   0.999   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Data not Normal at 5% Significance Level      Assuming Normal Distribution   95% Student's-t UCL   20085   95% Lobyshev (MVUE) UCL   20343   95% UCLs (Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   20345   95% Adjusted-CLT UCL (Chen-1995)   20378   97.5% Chebyshev (MVUE) UCL   20354   95% Modified-t UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   20354   20140   99% Chebyshev (MVUE) UCL   20354   20140   99% Chebyshev (MVUE) UCL   20354   20140   99% Chebyshev (MVUE) UCL   20145		!	
Shapiro Wilk Test Statistic   0.853   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939   Shapiro Wilk Critical Value   0.939	Name al Distribution Took	Relevant U	
Shapiro Wilk Critical Value   0.939		0.050	
Data appear Lognormal at 5% Significance Level	<b>!</b>		
Assuming Normal Distribution   95% Student's-t UCL   20085   95% Chebyshev (MVUE) UCL   20343   95% UCLs (Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   20343   95% Adjusted-CLT UCL (Chen-1995)   20378   97.5% Chebyshev (MVUE) UCL   26243   95% Modified-t UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   20343   97.5% Chebyshev (MVUE) UCL   20243   95% Modified-t UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   20343   20140   99% Chebyshev (MVUE) UCL   20140		0.939	
95% Student's-t UCL   20085   95% H-UCL   20343   95% UCLs (Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   23583   95% Adjusted-CLT UCL (Chen-1995)   20378   97.5% Chebyshev (MVUE) UCL   22583   95% Modified-t UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   231378   97.5% Chebyshev (MVUE) UCL   231378   95% Modified-t UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   231378   95% Modified-t UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   231378   95% Chebyshev (Mean, Sd) UCL   231378   95% Chebyshev (Mean, Sd) UCL   231378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebyshev (Mean, Sd) UCL   240378   95% Chebysh	Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
95% UCLs (Adjusted for Skewness) 95% Lock (Adjusted for Skewness) 95% Adjusted-CLT UCL (Chen-1995) 20378 95% Adjusted-CLT UCL (Chen-1995) 20378 95% Modified-t UCL (Johnson-1978) 20140 99% Chebyshev (MVUE) UCL 26213 95% Modified-t UCL (Johnson-1978) 20140 99% Chebyshev (MVUE) UCL 26213 95% Modified-t UCL (Johnson-1978) 20140 99% Chebyshev (MVUE) UCL 26213 95% Modified-t UCL (Johnson-1978) 20140 99% Chebyshev (MVUE) UCL 26213 95% Chebyshev (MVUE) UCL 26213 95% Chebyshev (MVUE) UCL 26213 95% Chebyshev (MVUE) UCL 26213 95% Chebyshev (MVUE) UCL 26213 95% Chebyshev (MVUE) UCL 26213 95% Chebyshev (MVUE) UCL 26213 95% Chebyshev (MVUE) UCL 26213 95% Chebyshev (MVUE) UCL 26213 95% Chebyshev (MVUE) UCL 26213 95% Chebyshev (MVUE) UCL 26213 95% Chebyshev (MVUE) UCL 26214 95% Chebyshev (Mean, Sd) UCL 26403 95% Chebyshev (Mean, Sd) UCL 26403 95% Chebyshev (Mean, Sd) UCL 26229 95% Adjusted Gamma UCL (Use when n ≤ 40) 20229  Potential UCL to Use Use 95% Approximate Gamma UCL 20122 Potential UCL to Use Use 95% Approximate Gamma UCL 20122  Potential UCL to Use Use 95% Approximate Gamma UCL 20122  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)	Assuming Normal Distribution		Assuming Lognormal Distribution
95% UCLs (Adjusted for Skewness)         95% Chebyshev (MVUE) UCL         2358:3           95% Adjusted-CLT UCL (Chen-1995)         20378         97.5% Chebyshev (MVUE) UCL         26213           95% Modified-t UCL (Johnson-1978)         20140         99% Chebyshev (MVUE) UCL         31378           Gamma Distribution Test         Data Distribution           K star (bias corrected)         4.161         Data appear Gamma Distributed at 5% Significance Level           Theta Star         4229           MLE of Standard Deviation         8626           MLE of Standard Deviation         8626           Approximate Chi Square Value (.05)         283.8         Nonparametric Statistics           Adjusted Level of Significance         0.0437         95% CLT UCL         20025           Adjusted Chi Square Value         282.3         95% Standard Bootstrap UCL         20085           Anderson-Darling Sw Critical Value         0.044         95% Bootstrap UCL         20646           Anderson-Darling Sw Critical Value         0.752         95% Hall's Bootstrap UCL         20647           Kolmogorov-Smirnov Test Statistic         0.122         95% BCA Bootstrap UCL         20487           Kolmogorov-Smirnov 5% Critical Value		20085	
95% Adjusted-CLT UCL (Chen-1995)   20378   97.5% Chebyshev (MVUE) UCL   26213   95% Modified-t UCL (Johnson-1978)   20140   99% Chebyshev (MVUE) UCL   31378    Gamma Distribution Test   Data Distribution			
Semma Distribution Test   Data Distribution	95% Adjusted-CLT UCL (Chen-1995)	20378	
k star (bias corrected) 4.161 Theta Star 4229  MLE of Mean 17596  MLE of Standard Deviation 8626 nu star 324.6  Approximate Chi Square Value (.05) 283.8  Adjusted Level of Significance 0.0437 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Anderson-Darling Test Statistic 0.604 Anderson-Darling 5% Critical Value 0.752 Anderson-Darling 5% Critical Value 0.752 Anderson-Darling 5% Critical Value 0.142 Asuming Gamma Distributed at 5% Significance Level  Data appear Gamma Distributed at 5% Significance Level  95% Chebyshev(Mean, Sd) UCL 24032  95% Approximate Gamma UCL (Use when n >= 40) 20122  95% Adjusted Gamma UCL (Use when n <= 40) 20229  Potential UCL to Use  Use 95% Approximate Gamma UCL 20122  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)			
k star (bias corrected) 4.161 Theta Star 4229  MLE of Mean 17596  MLE of Standard Deviation 8626 nu star 324.6  Approximate Chi Square Value (.05) 283.8  Adjusted Level of Significance 0.0437 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Adjusted Chi Square Value 282.3 Anderson-Darling Test Statistic 0.604 Anderson-Darling Test Statistic 0.122 Anderson-Darling 5% Critical Value 0.752 Anderson-Darling 5% Critical Value 0.752 Anderson-Darling 5% Critical Value 0.142 Asimpsorov-Smirnov 5% Critical Value 0.142 Asimpsorov-Smirnov 5% Critical Value 0.142 Assuming Gamma Distributed at 5% Significance Level  95% Chebyshev(Mean, Sd) UCL 24032  95% Approximate Gamma UCL (Use when n >= 40) 20122  95% Adjusted Gamma UCL (Use when n <= 40) 20229  Potential UCL to Use  Use 95% Approximate Gamma UCL 20122  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)			
Theta Star   4229   17596			Data Distribution
MLE of Mean   17596     MLE of Standard Deviation   8626     nu star   324.6     Approximate Chi Square Value (.05)   283.8     Adjusted Level of Significance   282.3   95% CLT UCL   20025     Adjusted Chi Square Value   282.3   95% Jackknife UCL   20085     Anderson-Darling Test Statistic   0.604   95% Bootstrap UCL   19975     Anderson-Darling 5% Critical Value   0.752   95% Hall's Bootstrap UCL   20487     Kolmogorov-Smirnov Test Statistic   0.122   95% Percentile Bootstrap UCL   20164     Kolmogorov-Smirnov 5% Critical Value   0.142   95% BCA Bootstrap UCL   20305     Data appear Gamma Distributed at 5% Significance Level   95% Chebyshev (Mean, Sd) UCL   20305     Assuming Gamma Distribution   99% Chebyshev (Mean, Sd) UCL   26816     95% Approximate Gamma UCL (Use when n < 40)   20122     95% Adjusted Gamma UCL (Use when n < 40)   20229     Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)			Data appear Gamma Distributed at 5% Significance Level
MLE of Standard Deviation nu star 324.6  Approximate Chi Square Value (.05) 283.8  Adjusted Level of Significance 0.0437  Adjusted Chi Square Value 282.3  Adjusted Chi Square Value 282.3  Sys Standard Bootstrap UCL 19975  Anderson-Darling Test Statistic 0.604  Anderson-Darling 5% Critical Value 0.752  Andingorov-Smirnov Test Statistic 0.122  Bata appear Gamma Distributed at 5% Significance Level  Assuming Gamma Distribution  Potential UCL to Use  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)	Theta Star	4229	
Nonparametric Statistics   Approximate Chi Square Value (.05)   283.8   Nonparametric Statistics			
Approximate Chi Square Value (.05)   283.8   Nonparametric Statistics			
Adjusted Level of Significance   0.0437   95% CLT UCL   20025			
Adjusted Chi Square Value 282.3 95% Jackknife UCL 20085 95% Standard Bootstrap UCL 19975 Anderson-Darling Test Statistic 0.604 95% Bootstrap-t UCL 20645 Anderson-Darling 5% Critical Value 0.752 95% Hall's Bootstrap UCL 20487 Kolmogorov-Smirnov Test Statistic 0.122 95% Percentile Bootstrap UCL 20164 Kolmogorov-Smirnov 5% Critical Value 0.142 95% BCA Bootstrap UCL 20305 Data appear Gamma Distributed at 5% Significance Level 95% Chebyshev (Mean, Sd) UCL 24032 95% Approximate Gamma UCL (Use when n >= 40) 20122 95% Adjusted Gamma UCL (Use when n < 40) 20229  Potential UCL to Use Use 95% Approximate Gamma UCL 20122 Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)			<u> </u>
Anderson-Darling Test Statistic   0.604   95% Bootstrap UCL   20648   Anderson-Darling 5% Critical Value   0.752   95% Hall's Bootstrap UCL   20487   Kolmogorov-Smirnov Test Statistic   0.122   95% Percentile Bootstrap UCL   20164   Kolmogorov-Smirnov 5% Critical Value   0.142   95% BCA Bootstrap UCL   20308   Kolmogorov-Smirnov 5% Critical Value   0.142   95% BCA Bootstrap UCL   20308   Data appear Gamma Distributed at 5% Significance Level   95% Chebyshev (Mean, Sd) UCL   24032   97.5% Chebyshev (Mean, Sd) UCL   26816   Assuming Gamma Distribution   99% Chebyshev (Mean, Sd) UCL   32286   95% Approximate Gamma UCL (Use when n >= 40)   20122   95% Adjusted Gamma UCL (Use when n < 40)   20229    Potential UCL to Use   Use 95% Approximate Gamma UCL   20122   Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)			
Anderson-Darling Test Statistic 0.604 95% Bootstrap-t UCL 20648 Anderson-Darling 5% Critical Value 0.752 95% Hall's Bootstrap UCL 20487 Kolmogorov-Smirnov Test Statistic 0.122 95% Percentile Bootstrap UCL 20164 Kolmogorov-Smirnov 5% Critical Value 0.142 95% BCA Bootstrap UCL 20308 Data appear Gamma Distributed at 5% Significance Level 95% Chebyshev(Mean, Sd) UCL 24032  Pata appear Gamma Distribution 99% Chebyshev(Mean, Sd) UCL 26816  Assuming Gamma Distribution 99% Chebyshev(Mean, Sd) UCL 26816  Assuming Gamma UCL (Use when n >= 40) 20122  95% Adjusted Gamma UCL (Use when n < 40) 20229  Potential UCL to Use Use 95% Approximate Gamma UCL 20122  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)	Adjusted Chi Square Value	282.3	
Anderson-Darling 5% Critical Value 0.752 95% Hall's Bootstrap UCL 20487 Kolmogorov-Smirnov Test Statistic 0.122 95% Percentile Bootstrap UCL 20164 Kolmogorov-Smirnov 5% Critical Value 0.142 95% BCA Bootstrap UCL 20308 Data appear Gamma Distributed at 5% Significance Level 95% Chebyshev(Mean, Sd) UCL 24032  Pata appear Gamma Distribution 95% Chebyshev(Mean, Sd) UCL 26816  Assuming Gamma Distribution 99% Chebyshev(Mean, Sd) UCL 26816  95% Approximate Gamma UCL (Use when n >= 40) 20122  95% Adjusted Gamma UCL (Use when n < 40) 20229  Potential UCL to Use Use 95% Approximate Gamma UCL 20122  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)			
Kolmogorov-Smirnov Test Statistic   0.122   95% Percentile Bootstrap UCL   20164			
Note: Suggestions regarding the selection of a 95% UCL.    Data appear Gamma Distributed at 5% Critical Value   0.142   95% BCA Bootstrap UCL   20308   204032   20			
Data appear Gamma Distributed at 5% Significance Level 95% Chebyshev(Mean, Sd) UCL 24032 97.5% Chebyshev(Mean, Sd) UCL 26816 Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40) 20122 95% Adjusted Gamma UCL (Use when n < 40) 20229  Potential UCL to Use Use 95% Approximate Gamma UCL 20122  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)			·
Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 20122  95% Adjusted Gamma UCL (Use when n < 40) 20229  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)			
Assuming Gamma Distribution  99% Chebyshev (Mean, Sd) UCL  32286  95% Approximate Gamma UCL (Use when n >= 40) 20122  95% Adjusted Gamma UCL (Use when n < 40) 20229  Potential UCL to Use  Use 95% Approximate Gamma UCL  Use 95% Approximate Gamma UCL  Use 95% Approximate Gamma UCL  Use 95% Approximate Gamma UCL  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)	Data appear Gamma Distributed at 5% Significance L	.evei	
95% Approximate Gamma UCL (Use when n >= 40) 20122 95% Adjusted Gamma UCL (Use when n < 40) 20229  Potential UCL to Use  Use 95% Approximate Gamma UCL 20122  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)	A O Distribution		
Potential UCL to Use  Use 95% Approximate Gamma UCL 20122  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)		20122	99% Chebysnev(Mean, Sd) UCL 3226
Potential UCL to Use  Use 95% Approximate Gamma UCL 20122  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)	95% Adjusted Gamma OCL (Ose when it < 40)	20229	
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)	Potential UCL to Use		Use 95% Approximate Gamma UCL 2012
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)			
	i nese recommendations are pased upon the res	suits of the S	

	Genera	I Statistics
Number of Valid Observations	39	Number of Distinct Observations 38
Raw Statistics		Log-transformed Statistics
Minimum	55.4	Minimum of Log Data 4.015
Maximum		Maximum of Log Data 6.308
	210.1	Mean of log Data 5.169
Geometric Mean	175.7	SD of log Data 0.622
Median	173	
SD	123.4	
Std. Error of Mean	19.76	
Coefficient of Variation	0.588	
Skewness	0.735	
	Dalamanti	IOI Otalistica
Normal Distribution Test	Relevant	JCL Statistics  Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.914	Shapiro Wilk Test Statistic 0.951
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value 0.939
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	243.4	95% H-UCL 261.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 310.7
95% Adjusted-CLT UCL (Chen-1995)	245.1	97.5% Chebyshev (MVUE) UCL 353.4
95% Modified-t UCL (Johnson-1978)	243.8	99% Chebyshev (MVUE) UCL 437.3
Gamma Distribution Test		Data Distribution
k star (bias corrected)	2.745	Data appear Gamma Distributed at 5% Significance Level
Theta Star	76.53	•
MLE of Mean	210.1	
MLE of Standard Deviation	126.8	
nu star		
Approximate Chi Square Value (.05)	181.2	Nonparametric Statistics
Adjusted Level of Significance	0.0437	95% CLT UCL 242.6
Adjusted Chi Square Value	180	95% Jackknife UCL 243.4
		95% Standard Bootstrap UCL 241.9
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 245.4
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 245.1
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 244.6
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 245.5
Data appear Gamma Distributed at 5% Significance L	.evel	95% Chebyshev(Mean, Sd) UCL 296.2
		97.5% Chebyshev(Mean, Sd) UCL 333.5
Assuming Gamma Distribution	T=	99% Chebyshev(Mean, Sd) UCL 406.7
95% Approximate Gamma UCL (Use when n >= 40)		
95% Adjusted Gamma UCL (Use when n < 40)	249.8	
Potential UCL to Use	<u> </u>	Use 95% Approximate Gamma UCL 248.1
Note: Suggestions regarding the selection of a 95%	6 UCL are p	rovided to help the user to select the most appropriate 95% UCL.
		simulation studies summarized in Singh, Singh, and laci (2002)

**Central Shipyard** 

**Unpaved Surface Soil** 

	General UCL Statistics fo	r Data Sets	with Non-Detects	
User Selected Options				
From File		Newport\De	recktor\Draft Final Risk Assessment\EPCs\Surface Soil - Central	Shipyard.
Full Precision	OFF			
Confidence Coefficient	95% 2000			
Number of Bootstrap Operations	2000			
DENIZO/ANTUDACENE				
BENZO(A)ANTHRACENE				
		General		
	Number of Valid Data	6	Number of Detected Data	2
Number	of Distinct Detected Data	2	Number of Non-Detect Data Percent Non-Detects	66.67%
			7 01001111011 2010310	
Raw S	tatistics		Log-transformed Statistics	
	Minimum Detected	140	Minimum Detected	4.942
	Maximum Detected	410	Maximum Detected	6.016
	Mean of Detected SD of Detected	275 190.9	Mean of Detected SD of Detected	5.479 0.76
	Minimum Non-Detect	330	Minimum Non-Detect	5.799
	Maximum Non-Detect	400	Maximum Non-Detect	5.799
	Maximum Holf-Dotott	700	Maximum Non-Detect	0.001
Note: Data have multiple DLs - Use of	of KM Method is recommen	ded	Number treated as Non-Detect	5
For all methods (except KM, DL/2, ar			Number treated as Detected	1
Observations < Largest ND are treate			Single DL Non-Detect Percentage	83.33%
<del></del>				
	Warning: Data s	set has only	2 Distinct Detected Values	
This may no			2 Distinct Detected Values. aningful and reliable test statistics and estimates.	
The Project Team may d	ot be adequate enough to decide to use alternative sit	compute me te specific v	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).	
The Project Team may d Unless Data Q	ot be adequate enough to on lecide to use alternative situality Objectives (DQOs) had tected data may not be ade	compute me te specific va nave been m	aningful and reliable test statistics and estimates.  alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.	
The Project Team may d	ot be adequate enough to on lecide to use alternative situality Objectives (DQOs) had tected data may not be ade	compute me te specific va nave been m	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.	
The Project Team may d Unless Data Q	ot be adequate enough to of lecide to use alternative sit ruality Objectives (DQOs) had tected data may not be ade Those methods will It is necessary to have 4	compute me te specific va  nave been m  equate enou return a 'N/  or more Dis	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.	
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The Project Team may d Unless Data Q The number of det	ot be adequate enough to of lecide to use alternative situality Objectives (DQOs) had been detected data may not be adea Those methods will be adea to be adea.	compute me te specific va  nave been m  equate enou return a 'N//  or more Dis d using 4 to	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.	
The Project Team may d Unless Data Q The number of det	ot be adequate enough to of lecide to use alternative situality Objectives (DQOs) had been detected data may not be adea Those methods will be adea to be adea.	compute me te specific va  nave been m  equate enou return a 'N//  or more Dis d using 4 to	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.	
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The Project Team may describe the Pr	ot be adequate enough to of lecide to use alternative situality Objectives (DQOs) in tected data may not be ade Those methods will lit is necessary to have 4 However, results obtained to have 10 to 15 or more with Detected Values Only	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only	
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The Project Team may describe the Pr	ot be adequate enough to decide to use alternative site and the state of the state	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value	
The Project Team may describe the Pr	ot be adequate enough to decide to use alternative situality Objectives (DQOs) had been decided at a may not be adea those methods will be a likely of the second of the s	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St	aningful and reliable test statistics and estimates.  alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic	N/A
The Project Team may de Unless Data Quantity of det It is recommended It is recommended Normal Distribution Test of Supplements Supplement	ot be adequate enough to decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decided at a may not be adea those methods will decided to have 4. However, results obtained at the decided to have 10 to 15 or more decided with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value of Significance Level	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level	N/A
The Project Team may de Unless Data Quantity of det It is recommended It is recommen	ot be adequate enough to decide to use alternative site and the state of the state	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value	N/A
The Project Team may de Unless Data Quantity of det It is recommended It is recommen	ot be adequate enough to of lecide to use alternative site lecide to use alternative site lecide to use alternative site lecide to use alternative site lecide to use alternative site lecide to be adea of those methods will let is necessary to have 4. However, results obtained and to have 10 to 15 or more lecided to have 10 to 15 or more lecided with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value 15% Significance Level lecided with lecided lecide	compute me te specific va nave been m equate enou return a 'N/A or more Dis d using 4 to e observation  UCL St N/A N/A N/A 210.8	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A N/A
The Project Team may de Unless Data Quantity of det It is recommended It is recommen	ot be adequate enough to decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decided at a may not be adecided at a may	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St /// /// /// // /// /// /// /// /// //	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD	N/A N/A 5.282 0.378
The Project Team may de Unless Data Quantity of det It is recommended It is recommen	ot be adequate enough to of lecide to use alternative site lecide to use alternative site lecide to use alternative site lecide to use alternative site lecide to use alternative site lecide to be adea of those methods will let is necessary to have 4. However, results obtained and to have 10 to 15 or more lecided to have 10 to 15 or more lecided with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value 15% Significance Level lecided with lecided lecide	compute me te specific va nave been m equate enou return a 'N/A or more Dis d using 4 to e observation  UCL St N/A N/A N/A 210.8	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean	N/A N/A 5.282
The Project Team may de Unless Data Quantity of det It is recommended It is recommen	ot be adequate enough to decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to be decided and any not be adea those methods will.  It is necessary to have 4 However, results obtained and to have 10 to 15 or more decided to have 10 to 15 or more decided with Critical Value of Significance Level decided and decided decided decided and decided	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St /// /// /// // /// /// /// /// /// //	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL	N/A N/A 5.282 0.378
The Project Team may de Unless Data Quantity of det It is recommended It is recommen	ot be adequate enough to decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to be decided at a may not be adea those methods will.  It is necessary to have 4 However, results obtained decided to have 10 to 15 or more decided to have 10 to 15 or more decided to have 10 to 15 or more decided with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value of Significance Level decided and mean SD 95% DL/2 (t) UCL and Estimate(MLE) Method	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St /// /// /// // /// /// /// /// /// //	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method	N/A N/A 5.282 0.378 315.4
The Project Team may de Unless Data Quantity of det It is recommended It is recommen	ot be adequate enough to decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to be decided and any not be adea those methods will.  It is necessary to have 4 However, results obtained and to have 10 to 15 or more decided to have 10 to 15 or more decided with Critical Value of Significance Level decided and decided decided decided and decided	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St /// /// /// // /// /// /// /// /// //	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale	N/A N/A 5.282 0.378
The Project Team may de Unless Data Quantity of det It is recommended It is recommen	ot be adequate enough to decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to be decided at a may not be adea those methods will.  It is necessary to have 4 However, results obtained decided to have 10 to 15 or more decided to have 10 to 15 or more decided to have 10 to 15 or more decided with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value of Significance Level decided and mean SD 95% DL/2 (t) UCL and Estimate(MLE) Method	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St /// /// /// // /// /// /// /// /// //	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale	N/A N/A 5.282 0.378 315.4
The Project Team may de Unless Data Quantity of det It is recommended It is recommen	ot be adequate enough to decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to be decided at a may not be adea those methods will.  It is necessary to have 4 However, results obtained decided to have 10 to 15 or more decided to have 10 to 15 or more decided to have 10 to 15 or more decided with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value of Significance Level decided and mean SD 95% DL/2 (t) UCL and Estimate(MLE) Method	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St /// /// /// // /// /// /// /// /// //	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  att, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  as for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale	5.282 0.378 315.4 N/A N/A
The Project Team may de Unless Data Quantity of det It is recommended It is recommen	ot be adequate enough to decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to be decided at a may not be adea those methods will.  It is necessary to have 4 However, results obtained decided to have 10 to 15 or more decided to have 10 to 15 or more decided to have 10 to 15 or more decided with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value of Significance Level decided and mean SD 95% DL/2 (t) UCL and Estimate(MLE) Method	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St /// /// /// // /// /// /// /// /// //	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  et, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale	5.282 0.378 315.4 N/A N/A N/A
The Project Team may de Unless Data Quantity of det It is recommended It is recommen	ot be adequate enough to decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to use alternative site decide to be decided at a may not be adea those methods will.  It is necessary to have 4 However, results obtained decided to have 10 to 15 or more decided to have 10 to 15 or more decided to have 10 to 15 or more decided with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value of Significance Level decided and mean SD 95% DL/2 (t) UCL and Estimate(MLE) Method	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St /// /// /// // /// /// /// /// /// //	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  at, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ns for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  SD in Original Scale  SD in Original Scale  95% t UCL  95% Percentile Bootstrap UCL	5.282 0.378 315.4 N/A N/A N/A
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BENZO(A)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A	2 4 4 4 10 10 10 10 10 10 10 10 10 10 10 10 10	
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	185
5% K-S Critical Value	N/A	SD	100.6
Data not Gamma Distributed at 5% Significance Leve	el	SE of Mean	58.09
		95% KM (t) UCL	302.1
Assuming Gamma Distribution		95% KM (z) UCL	280.6
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	396.1
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	410
Mean	N/A	95% KM (Percentile Bootstrap) UCL	410
Median	N/A	95% KM (Chebyshev) UCL	438.2
SD	N/A	97.5% KM (Chebyshev) UCL	547.8
k star	N/A	99% KM (Chebyshev) UCL	763
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	302.1
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	410
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight,	, the user m	ay want to consult a statistician.	

BENZO(A)PYRENE			
	General Stat	tistics	
Number of Valid Data	6	Number of Detected Data	
Number of Distinct Detected Data	2	Number of Non-Detect Data	
		Percent Non-Detects	66.67%
		,	
Raw Statistics		Log-transformed Statistics	
Minimum Detected	86	Minimum Detected	4.45
Maximum Detected	140	Maximum Detected	4.94
Mean of Detected	113	Mean of Detected	4.69
SD of Detected	38.18	SD of Detected	0.34
Minimum Non-Detect	330	Minimum Non-Detect	5.79
Maximum Non-Detect	400	Maximum Non-Detect	5.99
Note: Data have multiple DLs - Use of KM Method is recommend	dod	Number treated as Non-Detect	
For all methods (except KM, DL/2, and ROS Methods),	ueu	Number treated as Detected	
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.009
20301Valions \ Largest ND are freated as ND3		Olligic DE Non-Detect i creentage	100.007
Warning: Data se	et has only 2 D	Distinct Detected Values.	
		ngful and reliable test statistics and estimates.	
		es to estimate environmental parameters (e.g., EPC, BTV).	
Unless Data Quality Objectives (DQOs) ha	ave been met,	it is suggested to collect additional observations.	
		to perform GOF tests, bootstrap, and ROS methods.	
		to perform GOF tests, bootstrap, and ROS methods. value on your output display!	
Those methods will r	return a 'N/A' v	value on your output display!	
Those methods will r	return a 'N/A' v	ralue on your output display!  ct Values for bootstrap methods.	
Those methods will r  It is necessary to have 4 of the However, results obtained	return a 'N/A' v or more Distind d using 4 to 9 d	ct Values for bootstrap methods.  listinct values may not be reliable.	
Those methods will r  It is necessary to have 4 of the However, results obtained	return a 'N/A' v or more Distind d using 4 to 9 d	ralue on your output display!  ct Values for bootstrap methods.	
Those methods will r  It is necessary to have 4 of the However, results obtained	return a 'N/A' v or more Distind d using 4 to 9 d	ct Values for bootstrap methods.  listinct values may not be reliable.	
Those methods will r  It is necessary to have 4 of the However, results obtained	return a 'N/A' v or more Distind d using 4 to 9 d e observations	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.	
Those methods will r  It is necessary to have 4 of the However, results obtained to have 10 to 15 or more	return a 'N/A' v or more Distind d using 4 to 9 d	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.	V
Those methods will r  It is necessary to have 4 of the However, results obtained	return a 'N/A' v or more Distind d using 4 to 9 d e observations	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.	y N/A
Those methods will r  It is necessary to have 4 of the However, results obtained to have 10 to 15 or more the However of the H	or more Distinct using 4 to 9 dependence UCL Statis	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	
It is necessary to have 4 of However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	or more Distinct using 4 to 9 de observations  UCL Statis	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 of However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	or more Distinct using 4 to 9 de observations  UCL Statis	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level	N/A
It is necessary to have 4 of However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution	or more Distinct using 4 to 9 de observations  UCL Statis	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method	or more Distind using 4 to 9 de observations  UCL Statis  N/A  N/A	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	N/A N/A
It is necessary to have 4 of However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  156.8	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	N/A N/A 5.02
It is necessary to have 4 of However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  156.8  39.73	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	N/A N/A 5.02 0.30
It is necessary to have 4 of However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  156.8	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	N/A N/A 5.02 0.30
It is necessary to have 4 de However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  N/A  156.8  39.73  189.5	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	N/A N/A 5.02 0.30
It is necessary to have 4 de However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  156.8  39.73	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	N/A N/A N/A 5.02 0.30 214.
It is necessary to have 4 de However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  N/A  156.8  39.73  189.5	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	N/A N/A 5.02 0.30 214.
It is necessary to have 4 of However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more It is recommended It is recommende	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  N/A  156.8  39.73  189.5	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	5.02 0.30 214.
It is necessary to have 4 de However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  N/A  156.8  39.73  189.5	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	5.02 0.30 214. N/A N/A
It is necessary to have 4 de However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  N/A  156.8  39.73  189.5	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale	5.02 0.30 214. N/A N/A N/A
It is necessary to have 4 de However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  N/A  156.8  39.73  189.5	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale SD in Original Scale	5.02 0.30 214. N/A N/A N/A N/A
It is necessary to have 4 de However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  N/A  156.8  39.73  189.5	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL 95% Percentile Bootstrap UCL	5.02: 0.30 214.: N/A N/A N/A N/A N/A
It is necessary to have 4 dependent of the second of the s	or more Distinct using 4 to 9 de observations  UCL Statis  N/A  N/A  N/A  156.8  39.73  189.5	ct Values for bootstrap methods. listinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale SD in Original Scale	5.02: 0.30 214.: N/A N/A N/A N/A

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only					
k star (bias corrected) N/A		Data do not follow a Discernable Distribution (0.05)					
Theta Star	N/A						
nu star	N/A						
A-D Test Statistic	N/A	Nonparametric Statistics					
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method					
K-S Test Statistic	N/A	Mean	1				
5% K-S Critical Value	N/A	SD	2				
Data not Gamma Distributed at 5% Significance Leve	I	SE of Mean	2				
		95% KM (t) UCL	167				
Assuming Gamma Distribution		95% KM (z) UCL	157				
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	183				
Minimum	N/A	95% KM (bootstrap t) UCL	N/A				
Maximum	N/A	95% KM (BCA) UCL	14				
Mean	N/A	95% KM (Percentile Bootstrap) UCL	14				
Median	N/A	95% KM (Chebyshev) UCL	230				
SD	N/A	97.5% KM (Chebyshev) UCL	281				
k star	N/A	99% KM (Chebyshev) UCL	381				
Theta star	N/A	, ,					
Nu star	N/A	Potential UCLs to Use					
AppChi2	N/A	95% KM (t) UCL	167				
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL					
95% Adjusted Gamma UCL (Use when n < 40)	N/A						
Warning: Recommend	led UCL exce	eds the maximum observation					
L/2 is not a recommended method.							
Note: Suggestions regarding the selection of a 95% t	JCL are provi	ded to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results	of the simula	tion studies summarized in Singh, Maichle, and Lee (2006).					
For additional insight,	the user may	want to consult a statistician.					

	General Stati	istica	
Number of Valid Data	General Stati	Number of Detected Data	
Number of Distinct Detected Data	2	Number of Non-Detect Data	
Trainbor of biodifict bolcoted bata		Percent Non-Detects	66.679
		1 Groom Non Bototto	00.07
Raw Statistics		Log-transformed Statistics	
Minimum Detected	230	Minimum Detected	5.43
Maximum Detected	410	Maximum Detected	6.01
Mean of Detected	320	Mean of Detected	5.72
SD of Detected	127.3	SD of Detected	0.40
Minimum Non-Detect	330	Minimum Non-Detect	5.79
Maximum Non-Detect	400	Maximum Non-Detect	5.99
Note: Data have multiple DLs - Use of KM Method is recommen	ded	Number treated as Non-Detect	
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	00.00
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	83.33
Warning: Data s	ot has only 2 Di	istinct Detected Values.	
		ngful and reliable test statistics and estimates.	
The Project Team may decide to use alternative sit	te specific value	es to estimate environmental parameters (e.g., EPC, BTV).	
The Frequency accide to use alternative of	to opcome value	o to commute chimichian parameters (eig., 21 e, 21 v).	
Unless Data Quality Objectives (DQOs) h	nave been met, i	it is suggested to collect additional observations.	
	•		
The number of detected data may not be add	equate enough t	to perform GOF tests, bootstrap, and ROS methods.	
Those methods will			
THOSE MECHODS WIII	return a 'N/A' va	alue on your output display!	
It is necessary to have 4	or more Distinc	ct Values for bootstrap methods.	
It is necessary to have 4 However, results obtained	or more Distinc	ct Values for bootstrap methods. stinct values may not be reliable.	
It is necessary to have 4 However, results obtained	or more Distinc	ct Values for bootstrap methods.	
It is necessary to have 4 However, results obtained	or more Distinc	ct Values for bootstrap methods. stinct values may not be reliable.	
It is necessary to have 4 However, results obtained	or more Distinc d using 4 to 9 di e observations f	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.	
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more	or more Distinct d using 4 to 9 dis e observations f UCL Statist	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates. tics	
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more Normal Distribution Test with Detected Values Only	or more Distinct d using 4 to 9 dis e observations f	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates. tics Lognormal Distribution Test with Detected Values Only	
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more	or more Distinct d using 4 to 9 dis e observations f UCL Statist	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	or more Distinct d using 4 to 9 dise observations f  UCL Statist	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	or more Distinct d using 4 to 9 dise observations f	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	or more Distinct d using 4 to 9 dise observations f	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	or more Distinct d using 4 to 9 dise observations f	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution	UCL Statist	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	UCL Statist  N/A  N/A  N/A  225.8  93.24	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	UCL Statist	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	N/A N/A 5.36 0.34
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Statist N/A N/A 225.8 93.24 302.5	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	N/A N/A 5.36 0.34
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL Statist  N/A  N/A  N/A  225.8  93.24	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	5.36 0.34 321
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Statist N/A N/A 225.8 93.24 302.5	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	N/A N/A 5.36 0.34 321.
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL Statist N/A N/A 225.8 93.24 302.5	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	5.36 0.34 321 N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL Statist N/A N/A 225.8 93.24 302.5	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	5.36 0.34 321 N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL Statist  N/A  N/A  N/A  225.8  93.24  302.5	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	5.36 0.34 321 N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL Statist  N/A  N/A  N/A  225.8  93.24  302.5	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL	5.36 0.34 321 N/A N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL Statist  N/A  N/A  N/A  225.8  93.24  302.5	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL	N/A N/A 5.36 0.34 321. N/A N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statist  N/A  N/A  N/A  225.8  93.24  302.5	ct Values for bootstrap methods. stinct values may not be reliable. for accurate and meaningful results and estimates.  tics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL	N/A N/A 5.36 0.34 321. N/A N/A N/A

BENZO(B)FLUORANTHENE (Continued)								
Gamma Distribution Test with Detected Values Only	,	Data Distribution Test with Detected Values Only						
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)						
Theta Star	N/A	(*****)						
nu star	N/A							
A-D Test Statistic	N/A	Nonparametric Statistics						
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method						
K-S Test Statistic	N/A	Mean	260					
5% K-S Critical Value	N/A	SD	67.08					
Data not Gamma Distributed at 5% Significance Leve	əl	SE of Mean	38.73					
•		95% KM (t) UCL	338					
Assuming Gamma Distribution		95% KM (z) UCL	323.7					
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	400.7					
Minimum	N/A	95% KM (bootstrap t) UCL	N/A					
Maximum	N/A	95% KM (BCA) UCL	410					
Mean	N/A	95% KM (Percentile Bootstrap) UCL	410					
Median	N/A	95% KM (Chebyshev) UCL	428.8					
SD	N/A	97.5% KM (Chebyshev) UCL	501.9					
k star	N/A	99% KM (Chebyshev) UCL	645.4					
Theta star	N/A							
Nu star	N/A	Potential UCLs to Use						
AppChi2	N/A	95% KM (t) UCL						
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	410					
95% Adjusted Gamma UCL (Use when n < 40)	N/A							
Note: DL/2 is not a recommended method.								
		ovided to help the user to select the most appropriate 95% UCL.						
		ulation studies summarized in Singh, Maichle, and Lee (2006).						
For additional insight	t, the user m	nay want to consult a statistician.						

CHRYSENE			
	General Stati	ation	
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	<u>Z</u>
Number of Distinct Detected Data		Percent Non-Detects	66.67%
		1 Greent Non Beleete	00.07 /
Raw Statistics		Log-transformed Statistics	
Minimum Detected	120	Minimum Detected	4.787
Maximum Detected	420	Maximum Detected	6.04
Mean of Detected	270	Mean of Detected	5.414
SD of Detected	212.1	SD of Detected	0.886
Minimum Non-Detect	330	Minimum Non-Detect	5.79
Maximum Non-Detect	400	Maximum Non-Detect	5.99
Note: Data have multiple DLs - Use of KM Method is recommend	ded	Number treated as Non-Detect	į
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	83.33%
Morning, Date	at has ank 2 Di	stingt Detected Values	
		stinct Detected Values. gful and reliable test statistics and estimates.	
		s to estimate environmental parameters (e.g., EPC, BTV).	
The Project Team may decide to use alternative sit	e specific value	s to estimate environmental parameters (e.g., EPC, BTV).	
Unless Data Quality Objectives (DQOs) h	ave been met i	t is suggested to collect additional observations.	
omoso bata dadity objectives (b dee) in	iavo boon mot, i	t to buggestou to compet dualitional observations.	
The number of detected data may not be ade	equate enough t	o perform GOF tests, bootstrap, and ROS methods.	
		o perform GOF tests, bootstrap, and ROS methods.	
Those methods will	return a 'N/A' va		
Those methods will  It is necessary to have 4	return a 'N/A' va	alue on your output display!	
Those methods will  It is necessary to have 4 However, results obtained	or more Distinct using 4 to 9 dis	alue on your output display! t Values for bootstrap methods.	
Those methods will  It is necessary to have 4 However, results obtained	or more Distinct using 4 to 9 dis	t Values for bootstrap methods. stinct values may not be reliable.	
Those methods will  It is necessary to have 4 However, results obtained	return a 'N/A' va or more Distinc d using 4 to 9 die e observations f	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.	
Those methods will  It is necessary to have 4  However, results obtained  It is recommended to have 10 to 15 or more	or more Distinct using 4 to 9 dis	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.	
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more	or more Distinct using 4 to 9 dise observations for UCL Statist	t Values for bootstrap methods.  stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only	
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	or more Distinct using 4 to 9 dispersations for the UCL Statist	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	or more Distinct using 4 to 9 dise observations for UCL Statist	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	or more Distinct using 4 to 9 dispersations for the UCL Statist	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	or more Distinct using 4 to 9 dispersations for the UCL Statist	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	or more Distinct using 4 to 9 dispersations for UCL Statist	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution	or more Distinct using 4 to 9 dispersations for UCL Statist	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	or more Distinct using 4 to 9 dispersations for the observations for the	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	or more Distinct using 4 to 9 dispersations for the control of the	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	N/A N/A 5.26 0.418
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	or more Distinct using 4 to 9 dispersations for the observations for the	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	N/A N/A 5.26 0.418
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	or more Distinct using 4 to 9 dispersations for the observations for the	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	5.26 0.418 332.6
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	or more Distinct using 4 to 9 dispersations for the observations for the	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	5.26 0.418 332.6
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct using 4 to 9 dispersations for the observations for the	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	5.20 0.418 332.0
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct using 4 to 9 dispersations for the observations for the	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	5.20 0.411 332.0 N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct using 4 to 9 dispersations for the observations for the	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	5.20 0.410 332.0 N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct using 4 to 9 dispersations for the observations for the	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL	5.20 0.418 332.6 N/A N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	or more Distinct using 4 to 9 dispersations for the observations for the	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL 95% Percentile Bootstrap UCL	5.20 0.418 332.6 N/A N/A N/A
It is necessary to have 4 However, results obtained It is recommended to have 10 to 15 or more It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	or more Distinct using 4 to 9 dispersations for the observations for the	t Values for bootstrap methods. stinct values may not be reliable. or accurate and meaningful results and estimates.  ics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL	5.26 0.418 332.6 N/A N/A N/A N/A

CHRYSENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A	• • • • • • • • • • • • • • • • • • • •	
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	170
5% K-S Critical Value	N/A	SD	111.8
Data not Gamma Distributed at 5% Significance Leve	l	SE of Mean	64.55
		95% KM (t) UCL	300.1
Assuming Gamma Distribution		95% KM (z) UCL	276.2
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	404.5
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	420
Mean	N/A	95% KM (Percentile Bootstrap) UCL	420
Median	N/A	95% KM (Chebyshev) UCL	451.4
SD	N/A	97.5% KM (Chebyshev) UCL	573.1
k star	N/A	99% KM (Chebyshev) UCL	812.3
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	420
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL.	
These recommendations are based upon the results	s of the sim	ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight,	, the user m	ay want to consult a statistician.	

	0	FII D-4- O-	1-	
Lloar Salasted Options	General UCL Statistics for	or Full Data Se	ers	
User Selected Options From File		Nowport\Doro	ecktor\Draft Final Risk Assessment\EPCs\Surface Soil - Centr	al Chinyard
Full Precision	OFF	silvewport/Dere	ecklor/Drait i iriai Nisk Assessment/LF Cs/Surface Soil - Centi	ai Silipyaiu
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
Number of Bootstrap operations	2000			
ALUMINUM				
		General St	tatistics	
Num	ber of Valid Observations	6	Number of Distinct Observations	6
				!
Raw	Statistics		Log-transformed Statistics	
	Minimum	5820	Minimum of Log Data	8.669
	Maximum		Maximum of Log Data	9.488
	Mean	10850	Mean of log Data	
	Geometric Mean	10400	SD of log Data	
	Median	12400	•	
	SD	3098		
	Std. Error of Mean	1265		
	Coefficient of Variation	0.286		
	01			
Warning: A sample size	Skewness of 'n' = 6 may not adequa		ompute meaningful and reliable test statistics and estimates!	
It is	of 'n' = 6 may not adequa suggested to collect at lea	te enough to co	ompute meaningful and reliable test statistics and estimates	
It is	of 'n' = 6 may not adequa suggested to collect at lea	te enough to co	•	
It is	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu	te enough to co st 8 to 10 obse ality Objective	ervations using these statistical methods! s (DQO) based sample size and analytical results.	
It is If possible con	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu Warning:	te enough to const 8 to 10 observative	ervations using these statistical methods! s (DQO) based sample size and analytical results. s 6 Values in this data	
It is If possible con	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu Warning: hould be noted that even t	te enough to const 8 to 10 observative  There are only hough bootstra	ervations using these statistical methods! s (DQO) based sample size and analytical results.  of 6 Values in this data ap methods may be performed on this data set,	
It is If possible con	of 'n' = 6 may not adequal suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations	te enough to const 8 to 10 observative  There are only hough bootstrass may not be re	ervations using these statistical methods! s (DQO) based sample size and analytical results.  of 6 Values in this data ap methods may be performed on this data set, seliable enough to draw conclusions	
It is If possible con	of 'n' = 6 may not adequal suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations	te enough to const 8 to 10 observative  There are only hough bootstrass may not be re	ervations using these statistical methods! s (DQO) based sample size and analytical results.  of 6 Values in this data ap methods may be performed on this data set,	
It is If possible con	of 'n' = 6 may not adequal suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations	te enough to const 8 to 10 observative  There are only hough bootstrass may not be re	ervations using these statistical methods! s (DQO) based sample size and analytical results.  of Values in this data ap methods may be performed on this data set, eliable enough to draw conclusions  of data sets having more than 10-15 observations.	
It is If possible con Note: It si The literature	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations re suggests to use bootstra	te enough to const 8 to 10 observative.  There are only hough bootstras may not be reap methods on Relevant UCL	ervations using these statistical methods! s (DQO) based sample size and analytical results.  7 6 Values in this data ap methods may be performed on this data set, seliable enough to draw conclusions a data sets having more than 10-15 observations.  Statistics  Lognormal Distribution Test	
It is If possible con Note: It si The literature	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations re suggests to use bootstra etribution Test Shapiro Wilk Test Statistic	te enough to coust 8 to 10 obsessality Objectives  There are only hough bootstras may not be reap methods on Relevant UCL	ervations using these statistical methods! s (DQO) based sample size and analytical results.  7 6 Values in this data ap methods may be performed on this data set, eliable enough to draw conclusions a data sets having more than 10-15 observations.  Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic	0.774
It is If possible con Note: It si The literature Normal Dis	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations re suggests to use bootstra etribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value	te enough to coust 8 to 10 obsessality Objectives  There are only hough bootstras may not be reap methods on Relevant UCL	ervations using these statistical methods! ss (DQO) based sample size and analytical results.  7 6 Values in this data ap methods may be performed on this data set, seliable enough to draw conclusions a data sets having more than 10-15 observations.  Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value	0.774
It is If possible con Note: It si The literature Normal Dis	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations re suggests to use bootstra etribution Test Shapiro Wilk Test Statistic	te enough to coust 8 to 10 obsessality Objectives  There are only hough bootstras may not be reap methods on Relevant UCL	ervations using these statistical methods! s (DQO) based sample size and analytical results.  7 6 Values in this data ap methods may be performed on this data set, eliable enough to draw conclusions a data sets having more than 10-15 observations.  Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic	0.774
It is If possible con Note: It si The literature Normal Dis Data appear Normal a	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations re suggests to use bootstra etribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level	te enough to coust 8 to 10 obsessality Objectives  There are only hough bootstras may not be reap methods on Relevant UCL	ervations using these statistical methods! ss (DQO) based sample size and analytical results.  7 6 Values in this data ap methods may be performed on this data set, seliable enough to draw conclusions a data sets having more than 10-15 observations.  Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level	0.774
It is If possible con Note: It si The literatur  Normal Dis Data appear Normal a	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations re suggests to use bootstra etribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level	te enough to coust 8 to 10 observative.  There are only hough bootstras may not be reap methods on Relevant UCL 0.795	ervations using these statistical methods!  Is (DQO) based sample size and analytical results.  If 6 Values in this data Is per methods may be performed on this data set, Is peliable enough to draw conclusions  In data sets having more than 10-15 observations.  It is because the statistics of the statistic of t	0.774
It is If possible con Note: It si The literatur  Normal Dis Data appear Normal a	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations re suggests to use bootstra etribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level rmal Distribution 95% Student's-t UCL	te enough to coust 8 to 10 observative.  There are only hough bootstras may not be reap methods on Relevant UCL 0.795	ervations using these statistical methods!  Is (DQO) based sample size and analytical results.  If 6 Values in this data Is per methods may be performed on this data set, Is peliable enough to draw conclusions  In data sets having more than 10-15 observations.  It is because the statistics of the statistic of t	0.774 0.788
It is If possible contained to the possible	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations re suggests to use bootstra etribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level rmal Distribution 95% Student's-t UCL usted for Skewness)	te enough to coust 8 to 10 obsessality Objectives  There are only hough bootstrass may not be research may	ervations using these statistical methods!  Is (DQO) based sample size and analytical results.  If 6 Values in this data Is per methods may be performed on this data set, Is peliable enough to draw conclusions  It data sets having more than 10-15 observations.	0.774 0.788 15547 17433
It is If possible con Note: It si  The literatur  Normal Dis  Data appear Normal a  Assuming No  95% UCLs (Adjust	of 'n' = 6 may not adequa suggested to collect at lea mpute and collect Data Qu  Warning: hould be noted that even t the resulting calculations re suggests to use bootstra etribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level rmal Distribution 95% Student's-t UCL	te enough to coust 8 to 10 obsessality Objectives  There are only hough bootstrass may not be research to the property of the	ervations using these statistical methods!  Is (DQO) based sample size and analytical results.  If 6 Values in this data Is per methods may be performed on this data set, Is peliable enough to draw conclusions  In data sets having more than 10-15 observations.  It is because the statistics of the statistic of t	0.774 0.788 15547 17433 20260

Gamma Distribution Test		Data Distribution				
k star (bias corrected)	6.09	Data appear Normal at 5% Significance Level				
Theta Star		Data appear Normal at 070 digitilioaned 20101				
MLE of Mean						
MLE of Standard Deviation						
nu star						
Approximate Chi Square Value (.05)	54.4	Nonparametric Statistics				
Adjusted Level of Significance		95% CLT UCL 12931				
Adjusted Chi Square Value		95% Jackknife UCL 13399				
,		95% Standard Bootstrap UCL 12709				
Anderson-Darling Test Statistic	0.738	95% Bootstrap-t UCL 12802				
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 12124				
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 12800				
Kolmogorov-Smirnov 5% Critical Value	0.332	95% BCA Bootstrap UCL 12467				
Data not Gamma Distributed at 5% Significance Lev	vel	95% Chebyshev(Mean, Sd) UCL 16364				
		97.5% Chebyshev(Mean, Sd) UCL 18749				
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 23436				
95% Approximate Gamma UCL (Use when n >= 40)	14577					
95% Adjusted Gamma UCL (Use when n < 40)	16309					
Potential UCL to Use		Use 95% Student's-t UCL 13399				
Recommended	UCL excee	ds the maximum observation				
		rovided to help the user to select the most appropriate 95% UCL.				
		imulation studies summarized in Singh, Singh, and laci (2002)				
and Singh and Singh (2003). For	additional in	sight, the user may want to consult a statistician.				
Note: For highly	/ negative-sl	kewed data, confidence limits				
		rmal, and Gamma) may not be				
		hnson's methods provide				
adjustme	ents for posit	vely skewed data sets.				

NIC			
	<u> </u>	Obstation	
Manufacture (N. P. LO)		Statistics  Number of Distinct Observations	6
Number of Valid Observations	O	Number of Distinct Observations	b
Raw Statistics		Log-transformed Statistics	
Minimum	3.9	Minimum of Log Data	1.361
Maximum		Maximum of Log Data	
Mean	16.16	Mean of log Data	
Geometric Mean	12.95	SD of log Data	
Median	19.7		
SD	9.169		
Std. Error of Mean	3.743		
Coefficient of Variation			
Skewness	-0.774		
Warning: A sample size of 'n' = 6 may not adequa	te enough t	o compute meaningful and reliable test statistics and estimates!	
		bservations using these statistical methods! ives (DQO) based sample size and analytical results.	
•		· · · · · · · · · · · · · · · · · · ·	
		nly 6 Values in this data	
		strap methods may be performed on this data set, e reliable enough to draw conclusions	
-	•	-	
The literature suggests to use bootstra	ap methods	on data sets having more than 10-15 observations.	
	Relevent I	ICL Statistics	
Normal Distribution Test	IJEIGAGIII C	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.811	Shapiro Wilk Test Statistic	0.767
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
Data appear Normal at 5% Significance Level	0.700	Data not Lognormal at 5% Significance Level	0.7.00
<sub>1</sub> , p			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	23.7	95% H-UCL	66
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)		97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)	23.5	99% Chebyshev (MVUE) UCL	72.84
		D . D	
Gamma Distribution Test	1 010	Data Distribution	
k star (bias corrected) Theta Star		Data appear Normal at 5% Significance Level	
MLE of Mean			
MLE of Mean MLE of Standard Deviation			
nu star			
Approximate Chi Square Value (.05)		Nonparametric Statistics	
Adjusted Level of Significance		95% CLT UCL	22 32
Adjusted Chi Square Value		95% Jackknife UCL	
, lajastica oni oqualo valuo	J. <b>U</b> _	95% Standard Bootstrap UCL	
Anderson-Darling Test Statistic	0.77	95% Bootstrap-t UCL	
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL	
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL	
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL	
Data not Gamma Distributed at 5% Significance Lev		95% Chebyshev(Mean, Sd) UCL	
		97.5% Chebyshev(Mean, Sd) UCL	
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	
95% Approximate Gamma UCL (Use when n >= 40)	32.63		
95% Adjusted Gamma UCL (Use when n < 40)			
Potential UCL to Use		Use 95% Student's-t UCL	23.7
Note: Suggestions regarding the selection of a 05%	LICI ara -	royided to help the uppr to palest the most engrapsists OEV LICE	
		rovided to help the user to select the most appropriate 95% UCL imulation studies summarized in Singh, Singh, and laci (2002)	
		imulation studies summarized in Singn, Singn, and laci (2002) isight, the user may want to consult a statistician.	
anu əniyin anu əniyin (2003). Fül i			
	negative-e		
Note: For highly			
Note: For highly (e.g., Chen, John	son, Logno	rmal, and Gamma) may not be shnson's methods provide	

General St						
Number of Valid Observations 6	Number of Distinct Observations 6					
D. O. H.	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1					
Raw Statistics	Log-transformed Statistics					
Minimum 9.8	Minimum of Log Data 2.28					
Maximum 18.2	Maximum of Log Data 2.90					
Mean 14.53  Geometric Mean 14.18	Mean of log Data 2.65 SD of log Data 0.25					
Median 15.7	SD of log Data 0.25					
SD 3.353						
Std. Error of Mean 1.369						
Coefficient of Variation 0.231						
Skewness -0.684						
Skewiless -0.004						
Warning: A sample size of 'n' = 6 may not adequate enough to co	omnute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 obse						
If possible compute and collect Data Quality Objectives	s (DQO) based sample size and analytical results.					
Warning: There are only	6 Values in this data					
Note: It should be noted that even though bootstra						
the resulting calculations may not be re						
	•					
The literature suggests to use bootstrap methods on	data sets having more than 10-15 observations.					
B.1						
Relevant UCL						
Normal Distribution Test	Lognormal Distribution Test					
Shapiro Wilk Test Statistic 0.883	Shapiro Wilk Test Statistic 0.85					
Shapiro Wilk Critical Value 0.788	Shapiro Wilk Critical Value 0.78					
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level					
Assumain a Name of Distribution	Accompliant concernal Distribution					
Assuming Normal Distribution  95% Student's-t UCL 17.29	Assuming Lognormal Distribution 95% H-UCL 18.5					
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL 21.0					
95% Adjusted-CLT UCL (Chen-1995) 16.38	97.5% Chebyshev (MVUE) UCL 23.8					
95% Modified-t UCL (Johnson-1978) 17.23	99% Chebyshev (MVUE) UCL 29.3					
Gamma Distribution Test	Data Distribution					
k star (bias corrected) 10.31	Data appear Normal at 5% Significance Level					
Theta Star 1.41	Data appear Normal at 5 % Significance Level					
MLE of Mean 14.53						
MLE of Mean 14.53  MLE of Standard Deviation 4.527						
nu star 123.7						
Approximate Chi Square Value (.05) 99.01	Nonparametric Statistics					
Adjusted Level of Significance 0.0122	Nonparametric Statistics 95% CLT UCL 16.7					
Adjusted Level of Significance 0.0122  Adjusted Chi Square Value 91.04	95% CET OCE 16.7 95% Jackknife UCL 17.2					
Aujusteu Offi Oquale Value 31.04	95% Standard Bootstrap UCL 16.5					
Anderson-Darling Test Statistic 0.527	95% Standard Bootstrap GCL 10.5					
Anderson-Darling 1est statistic 0.327  Anderson-Darling 5% Critical Value 0.697	95% Hall's Bootstrap UCL 16.0					
Kolmogorov-Smirnov Test Statistic 0.321	95% Percentile Bootstrap UCL 16.6					
Kolmogorov-Smirnov 7est Statistic 0.321  Kolmogorov-Smirnov 5% Critical Value 0.332	95% BCA Bootstrap UCL 16.3					
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL 20.5					
Data appear dumina biotilibated at 070 digililledited Level	97.5% Chebyshev(Mean, Sd) UCL 23.0					
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL 28.1					
95% Approximate Gamma UCL (Use when n >= 40) 18.16	20.1					
95% Adjusted Gamma UCL (Use when n < 40) 19.75						
30 /0 Aujusteu Gaitiilla OOL (OSE WHEITH < 40) 13.73						
Potential UCL to Use	Use 95% Student's-t UCL 17.2					
i oteitiai ool to ose	05e 35 /6 Student 5-t OCL 17.2					
Note: Suggestions regarding the selection of a 95% UCL are provi	ided to help the user to select the most appropriate 95% LICI					
These recommendations are based upon the results of the simulations						
and Singh and Singh (2003). For additional insig						
and only i and only i (2003). For additional insig						
Note: For highly negative skey						
Note: For highly negative-skew						
Note: For highly negative-skew (e.g., Chen, Johnson, Lognorma reliable. Chen's and Johns	al, and Gamma) may not be					

		Statistics					
Number of Valid Observations	6	Number of Distinct Observations 5					
Raw Statistics		Log-transformed Statistics					
Minimum	7.6	Log-transformed Statistics  Minimum of Log Data 2.02					
Maximum		Maximum of Log Data 2					
Mean		Mean of log Data 2					
Geometric Mean		SD of log Data 0					
Median		3D of log Data of					
	3.082						
Std. Error of Mean							
Coefficient of Variation							
Skewness							
Skewness	-0.739						
Warning: A sample size of 'n' = 6 may not adequate	te enough t	o compute meaningful and reliable test statistics and estimates!					
		bservations using these statistical methods!					
If possible compute and collect Data Qu	ality Object	ives (DQO) based sample size and analytical results.					
Warning:	There are o	nly 6 Values in this data					
		strap methods may be performed on this data set,					
		e reliable enough to draw conclusions					
•	· ·	*					
The literature suggests to use bootstra	ap methods	on data sets having more than 10-15 observations.					
	Relevant U	CL Statistics					
Normal Distribution Test	,	Lognormal Distribution Test					
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic 0					
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value 0					
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level					
Assuming Normal Distribution		Assuming Lognormal Distribution					
95% Student's-t UCL	14.58	95% H-UCL 1					
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 1					
95% Adjusted-CLT UCL (Chen-1995)		97.5% Chebyshev (MVUE) UCL 2					
95% Modified-t UCL (Johnson-1978)	14.51	99% Chebyshev (MVUE) UCL 2					
Gamma Distribution Test	,	Data Distribution					
k star (bias corrected)		Data appear Normal at 5% Significance Level					
Theta Star							
MLE of Mean							
MLE of Standard Deviation							
nu star							
Approximate Chi Square Value (.05)		Nonparametric Statistics					
Adjusted Level of Significance		95% CLT UCL 1					
Adjusted Chi Square Value	69.85	95% Jackknife UCL 1					
		95% Standard Bootstrap UCL 1					
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 1					
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 1					
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 1					
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 1					
Data appear Gamma Distributed at 5% Significance L	evel	95% Chebyshev(Mean, Sd) UCL 1					
		97.5% Chebyshev(Mean, Sd) UCL 1					
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 2					
95% Approximate Gamma UCL (Use when n >= 40)							
	17.02						
95% Approximate Gamma UCL (Use when n >= 40)	17.02						
95% Approximate Gamma UCL (Use when n >= 40)	17.02	Use 95% Student's-t UCL 1					
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	17.02	Use 95% Student's-t UCL 1					
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use		Use 95% Student's-t UCL 1 rovided to help the user to select the most appropriate 95% UCL.					
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95%	UCL are p						
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the resi	UCL are poults of the s	rovided to help the user to select the most appropriate 95% UCL.					
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the research and Singh and Singh (2003). For a	UCL are poults of the sadditional in	rovided to help the user to select the most appropriate 95% UCL. imulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.					
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the researd Singh and Singh (2003). For a Note: For highly	o UCL are produits of the sadditional in	rovided to help the user to select the most appropriate 95% UCL. imulation studies summarized in Singh, Singh, and laci (2002)					
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the researd Singh and Singh (2003). For a Note: For highly (e.g., Chen, John	o UCL are products of the sadditional in regative-sinson, Logno	rovided to help the user to select the most appropriate 95% UCL. imulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician. kewed data, confidence limits					

	General	Statistics
Number of Valid Observations		Number of Distinct Observations 6
Raw Statistics		Log transformed Ctatistics
Minimum	10500	Log-transformed Statistics Minimum of Log Data 9.82
Maximum		Maximum of Log Data 10.3
	28033	Mean of log Data 10.3
Geometric Mean		SD of log Data 0.23
Median		05 01 log 54td 0.20
	5783	
Std. Error of Mean		
Coefficient of Variation	0.206	
Skewness	-1.208	
Warning: A sample size of 'n' = 6 may not adequa	te enough to	compute meaningful and reliable test statistics and estimates!
		servations using these statistical methods! ves (DQO) based sample size and analytical results.
Warning:	There are or	nly 6 Values in this data
		trap methods may be performed on this data set,
		reliable enough to draw conclusions
	•	
I he literature suggests to use bootstra	ap metnods	on data sets having more than 10-15 observations.
	Relevant I I	CL Statistics
Normal Distribution Test	T COCYAIN O	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.782	Shapiro Wilk Test Statistic 0.76
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value 0.78
Data not Normal at 5% Significance Level	101100	Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	32791	95% H-UCL 350
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 395
95% Adjusted-CLT UCL (Chen-1995)		97.5% Chebyshev (MVUE) UCL 445
95% Modified-t UCL (Johnson-1978)	32597	99% Chebyshev (MVUE) UCL 543
Gamma Distribution Test	1	Data Distribution
k star (bias corrected)		Data do not follow a Discernable Distribution (0.05)
Theta Star		
MLE of Mean MLE of Standard Deviation		
nu star Approximate Chi Square Value (.05)		Nonparametric Statistics
Approximate Clif Square Value (.03)  Adjusted Level of Significance		95% CLT UCL 319
Adjusted Level of Significance Adjusted Chi Square Value		95% Jackknife UCL 327
Augusted Sin Square Value		95% Standard Bootstrap UCL 315
Anderson-Darling Test Statistic	0.79	95% Bootstrap-t UCL 316
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 304
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 316
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 313
Data not Gamma Distributed at 5% Significance Lev		95% Chebyshev(Mean, Sd) UCL 383
•		97.5% Chebyshev(Mean, Sd) UCL 427
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 515
95% Approximate Gamma UCL (Use when n >= 40)		
95% Adjusted Gamma UCL (Use when n < 40)	37027	
<b>.</b>		
Potential UCL to Use		Use 95% Student's-t UCL 327
		or 95% Modified-t UCL 325
		ds the maximum observation
Recommended		
Recommended  Note: Suggestions regarding the selection of a 95%	UCL are pr	povided to help the user to select the most appropriate 95% UCL.
Recommended  Note: Suggestions regarding the selection of a 95%  These recommendations are based upon the res	UCL are prults of the si	mulation studies summarized in Singh, Singh, and laci (2002)
Recommended  Note: Suggestions regarding the selection of a 95%  These recommendations are based upon the res  and Singh and Singh (2003). For	UCL are prule of the si additional in	mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.
Recommended Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For a	UCL are products of the single	mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician. ewed data, confidence limits
Recommended  Note: Suggestions regarding the selection of a 95%  These recommendations are based upon the res  and Singh and Singh (2003). For a  Note: For highly  (e.g., Chen, John	UCL are produits of the single additional income or negative-skeepson, Lognor	mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.

		Statistics					
Number of Valid Observations	6			Numbe	r of Distinct	Observations	6
Davis Chablanian			1.5	- tf		·	
Raw Statistics Minimum	207.5		LO	g-transion	med Statisti	m of Log Data	5 60
Maximum						m of Log Data	
	380.9					an of log Data	
Geometric Mean						SD of log Data	
Median						75 01 10g 5 ata	10.17
	65.3						
Std. Error of Mean	26.66						
Coefficient of Variation	0.171						
Skewness	-0.171						
Warning: A sample size of 'n' = 6 may not adequa  It is suggested to collect at lea  If possible compute and collect Data Qu	st 8 to 10 ol	bservations us	sing these stat	tistical met	hods!		!
ii possible compute and collect Data Qu	iality Object	ives (DQO) ba	iseu sampie s	ize and an	iaiyucai res	uits.	
		nly 6 Values ir					
Note: It should be noted that even t					nis data set,	1	
the resulting calculation	s may not be	e reliable enou	ugh to draw co	onclusions			
The literature suggests to use bootstr	ap methods	on data sets h	naving more th	nan 10-15	observatior	ns.	
Name of Bladderston Tark	Relevant U	CL Statistics					
Normal Distribution Test Shapiro Wilk Test Statistic	n 977		LOĮ		stribution T	esτ Test Statistic	ln 00
Shapiro Wilk Test Statistic						Critical Value	
Data appear Normal at 5% Significance Level	0.700		Data appear l				
Data appear Normal at 3 % Significance Level			Data appear i	-ognomiai	at 5 /6 Sigit	ilicalice Leve	
Assuming Normal Distribution			Assur	nina Loan	ormal Distril	bution	
95% Student's-t UCL	434.6		7.15541	9 9		95% H-UCL	448
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 499.8					
95% Adjusted-CLT UCL (Chen-1995)	422.8					(MVUE) UCL	
95% Modified-t UCL (Johnson-1978)						(MVUE) UCL	
							•
Gamma Distribution Test					stribution		
k star (bias corrected)			Data appear	r Normal a	t 5% Signifi	cance Level	
Theta Star							
MLE of Mean							
MLE of Standard Deviation							
nu star							
Approximate Chi Square Value (.05)			N	onparame	tric Statistic		404
Adjusted Level of Significance						95% CLT UCL	
Adjusted Chi Square Value	193.0			OE0/		lackknife UCL Bootstrap UCL	
Anderson-Darling Test Statistic	0.442			95%		otstrap UCL	
Anderson-Darling 1est Statistic  Anderson-Darling 5% Critical Value				C		Bootstrap UCL	
Kolmogorov-Smirnov Test Statistic						Bootstrap UCL	
Kolmogorov-Smirnov 5% Critical Value						Bootstrap UCL	
Data appear Gamma Distributed at 5% Significance L						ean, Sd) UCL	
,						ean, Sd) UCL	
Assuming Gamma Distribution						ean, Sd) UCL	
95% Approximate Gamma UCL (Use when n >= 40)							
95% Adjusted Gamma UCL (Use when n < 40)	472.6						
Potential UCL to Use		1	,	l	Jse 95% St	udent's-t UCL	434.
		1				1	
Note: Suggestions regarding the selection of a 95%							L.
These recommendations are based upon the res						na laci (2002)	
and Singh and Singh (2003). For	additional in	ISIGNT, the usei	r may want to	consult a	statistician.		
							Ь
Nata. Fa- hishb	nogotive el	kowod dota	onfidonas IImi	to			
Note: For highly							
(e.g., Chen, Johr	nson, Logno		nma) may not				

Central Shipyard
Surface Soil

Ge	eneral UCL Statistics fo	r Data Sets	with Non-Detects	
User Selected Options	erierai OOL Otatistics 10	Data Oeta	Will NOII-Detects	
	\Work Folders\Projects\	Newport\De	recktor\Draft Final Risk Assessment\EPCs\Surface Soil - Central	I Shipyard.:
Full Precision OF				
Confidence Coefficient 95				
Number of Bootstrap Operations   20	000			
BENZO(A)ANTHRACENE				
, ,				
		General	- 14-14-14-14	
	Number of Valid Data Distinct Detected Data	6	Number of Detected Data  Number of Non-Detect Data	2
Number of L	Distinct Detected Data	2	Percent Non-Detects	66.67%
			1 Grooth Hori Bolooto	00.0770
Raw Statis	stics		Log-transformed Statistics	
	Minimum Detected	140	Minimum Detected	4.942
	Maximum Detected	410	Maximum Detected	6.016
	Mean of Detected	275	Mean of Detected	5.479
	SD of Detected	190.9	SD of Detected	0.76
	Minimum Non-Detect	330	Minimum Non-Detect	5.799
	Maximum Non-Detect	400	Maximum Non-Detect	5.991
Note: Data have multiple DLs - Use of KI	M Method is recommen	ded	Number treated as Non-Detect	5
For all methods (except KM, DL/2, and F		ucu	Number treated as Non-Detected	1
i oi ali ilictilodo (except Rivi, DE/Z, alia i			Single DL Non-Detect Percentage	83.33%
Observations < Largest ND are treated a				
This may not be The Project Team may deci Unless Data Quali	Warning: Data s e adequate enough to c ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade	compute me te specific va nave been m	2 Distinct Detected Values. aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV). net, it is suggested to collect additional observations. gh to perform GOF tests, bootstrap, and ROS methods.	
This may not be The Project Team may deci  Unless Data Quali  The number of detect	Warning: Data s e adequate enough to c ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade Those methods will t is necessary to have 4 owever, results obtained	compute me te specific va  nave been m  equate enou return a 'N/  or more Dis d using 4 to	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.	
This may not be The Project Team may deci  Unless Data Quali  The number of detect	Warning: Data s e adequate enough to c ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade Those methods will t is necessary to have 4 owever, results obtained	compute me te specific va  nave been m  equate enou return a 'N/  or more Dis d using 4 to	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.	
This may not be The Project Team may deci  Unless Data Quali  The number of detect	Warning: Data s e adequate enough to c ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade Those methods will t is necessary to have 4 owever, results obtained	compute me te specific va nave been m equate enou return a 'N/ or more Dis d using 4 to e observation	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ons for accurate and meaningful results and estimates.	
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t	Warning: Data s e adequate enough to c ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade Those methods will t is necessary to have 4 owever, results obtained to have 10 to 15 or more	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  agh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  attistics	W
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t	Warning: Data see adequate enough to coide to use alternative site ity Objectives (DQOs) hated data may not be adea Those methods will at its necessary to have 4 to wever, results obtained to have 10 to 15 or more an Detected Values Only	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  estinct Values for bootstrap methods.  9 distinct values may not be reliable.  ens for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onli	
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t  Normal Distribution Test with Shap	Warning: Data s e adequate enough to o ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade Those methods will t is necessary to have 4 owever, results obtained to have 10 to 15 or more	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic	ly N/A N/A
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t  Normal Distribution Test with  Shap	Warning: Data s e adequate enough to o ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade Those methods will t is necessary to have 4 owever, results obtained to have 10 to 15 or more in Detected Values Only piro Wilk Test Statistic biro Wilk Critical Value	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  estinct Values for bootstrap methods.  9 distinct values may not be reliable.  ens for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onli	N/A
This may not be The Project Team may decided and the Project Team	Warning: Data se adequate enough to cide to use alternative sit ity Objectives (DQOs) hated data may not be adea Those methods will at is necessary to have 4 to have 10 to 15 or more to have 10 to 15 or more to have Walles Statistic piro Wilk Test Statistic piro Wilk Critical Value Significance Level	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level	N/A
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t  Normal Distribution Test with Shap 5% Shap Data not Normal at 5% s  Assuming Normal	Warning: Data s e adequate enough to o ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade Those methods will t is necessary to have 4 owever, results obtained to have 10 to 15 or more to have 10 to 15 or more in Detected Values Only piro Wilk Test Statistic piro Wilk Critical Value Significance Level I Distribution	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t  Normal Distribution Test with Shap 5% Shap Data not Normal at 5% s  Assuming Normal	Warning: Data s e adequate enough to o ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade Those methods will t is necessary to have 4 owever, results obtained to have 10 to 15 or more to have 10 to 15 or more in Detected Values Only piro Wilk Test Statistic biro Wilk Critical Value Significance Level I Distribution (2 Substitution Method	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  gh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ons for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	N/A N/A
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t  Normal Distribution Test with Shap 5% Shap Data not Normal at 5% s  Assuming Normal	Warning: Data s e adequate enough to o ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade Those methods will t is necessary to have 4 owever, results obtained to have 10 to 15 or more to have 10 to 15 or more in Detected Values Only piro Wilk Test Statistic piro Wilk Critical Value Significance Level I Distribution (2 Substitution Method Mean	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A  N/A  210.8	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  Ins for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean	N/A N/A 5.282
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t  Normal Distribution Test with Shap 5% Shap Data not Normal at 5% s  Assuming Normal	Warning: Data s e adequate enough to o ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade Those methods will t is necessary to have 4 owever, results obtained to have 10 to 15 or more to have 10 to 15 or more in Detected Values Only piro Wilk Test Statistic biro Wilk Critical Value Significance Level I Distribution (2 Substitution Method Mean SD	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A  N/A  210.8  99.47	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD	N/A N/A 5.282 0.378
This may not be The Project Team may decided and the Project Team may be a supplied to the Project Team may be a suppli	Warning: Data s e adequate enough to o ide to use alternative sit ity Objectives (DQOs) h ted data may not be ade Those methods will t is necessary to have 4 owever, results obtained to have 10 to 15 or more to have 10 to 15 or more in Detected Values Only piro Wilk Test Statistic piro Wilk Critical Value Significance Level I Distribution (2 Substitution Method Mean	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A  N/A  210.8	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  Ins for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean	N/A N/A
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t  Normal Distribution Test with Shap 5% Shap Data not Normal at 5% s  Assuming Normal	Warning: Data se adequate enough to cide to use alternative sit ity Objectives (DQOs) hated data may not be adea Those methods will at is necessary to have 4 to have 10 to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A  N/A  210.8  99.47	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  attinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL	N/A N/A 5.282 0.378
This may not be The Project Team may decided and the Project Team may be a supplied to the Project Team may be a suppli	Warning: Data se adequate enough to cide to use alternative sit ity Objectives (DQOs) had data may not be adea Those methods will at is necessary to have 4 to have 10 to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A  N/A  210.8  99.47  292.7	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD	N/A N/A 5.282 0.378
This may not be The Project Team may decided and the Project Team	Warning: Data se adequate enough to cide to use alternative sit ity Objectives (DQOs) had data may not be adea Those methods will at is necessary to have 4 to have 10 to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A  N/A  210.8  99.47  292.7	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  Ins for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method	N/A N/A 5.282 0.378 315.4
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t  Normal Distribution Test with Shap 5% Shap Data not Normal at 5% s  Assuming Normal  DL/	Warning: Data se adequate enough to cide to use alternative sit ity Objectives (DQOs) had data may not be adea Those methods will at is necessary to have 4 to have 10 to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A  N/A  210.8  99.47  292.7	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  alues to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  Ins for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale	N/A N/A 5.282 0.378 315.4
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t  Normal Distribution Test with Shap 5% Shap Data not Normal at 5% s  Assuming Normal  DL/	Warning: Data se adequate enough to cide to use alternative sit ity Objectives (DQOs) had data may not be adea Those methods will at is necessary to have 4 to have 10 to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A  N/A  210.8  99.47  292.7	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  apply to perform GOF tests, bootstrap, and ROS methods.  A value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  Ins for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onloginal Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  SD in Original Scale	5.282 0.378 315.4 N/A N/A
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t  Normal Distribution Test with Shap 5% Shap Data not Normal at 5% s  Assuming Normal  DL/	Warning: Data se adequate enough to cide to use alternative sit ity Objectives (DQOs) had data may not be adea Those methods will at is necessary to have 4 to have 10 to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A  N/A  210.8  99.47  292.7	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  agh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale SD in Original Scale	5.282 0.378 315.4 N/A N/A N/A N/A
This may not be The Project Team may deci  Unless Data Quali  The number of detect  It  Ho  It is recommended t  Normal Distribution Test with Shap 5% Shap Data not Normal at 5% s  Assuming Normal  DL/	Warning: Data se adequate enough to cide to use alternative sit ity Objectives (DQOs) had data may not be adea Those methods will at is necessary to have 4 to have 10 to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A  N/A  210.8  99.47  292.7	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  agh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Coriginal Scale SD in Original Scale SD in Original Scale 95% t UCL	5.282 0.378 315.4 N/A N/A N/A N/A N/A
This may not be The Project Team may decided and the Project Team	Warning: Data se adequate enough to cide to use alternative sit ity Objectives (DQOs) had data may not be adea Those methods will at is necessary to have 4 to have 10 to 15 or more to 15 or more to 15 or more to 15 or more to 15 or more to 15 or	compute me te specific va nave been m equate enou return a 'N// or more Dis d using 4 to e observation  UCL St  N/A  N/A  N/A  210.8  99.47  292.7	aningful and reliable test statistics and estimates. alues to estimate environmental parameters (e.g., EPC, BTV).  net, it is suggested to collect additional observations.  agh to perform GOF tests, bootstrap, and ROS methods.  A' value on your output display!  stinct Values for bootstrap methods.  9 distinct values may not be reliable.  ans for accurate and meaningful results and estimates.  atistics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale SD in Original Scale	5.282 0.378 315.4 N/A N/A N/A N/A

BENZO(A)ANTHRACENE (Continued)						
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only				
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)				
Theta Star	N/A					
nu star	N/A					
A-D Test Statistic	N/A	Nonparametric Statistics				
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method				
K-S Test Statistic	N/A	Mean	185			
5% K-S Critical Value	N/A	SD	100.6			
Data not Gamma Distributed at 5% Significance Leve	el	SE of Mean	58.09			
		95% KM (t) UCL	302.1			
Assuming Gamma Distribution		95% KM (z) UCL	280.6			
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	396.1			
Minimum	N/A	95% KM (bootstrap t) UCL	185			
Maximum	N/A	95% KM (BCA) UCL	N/A			
Mean	N/A	95% KM (Percentile Bootstrap) UCL	410			
Median	N/A	95% KM (Chebyshev) UCL	438.2			
SD	N/A	97.5% KM (Chebyshev) UCL	547.8			
k star	N/A	99% KM (Chebyshev) UCL	763			
Theta star	N/A					
Nu star	N/A	Potential UCLs to Use				
AppChi2	N/A	95% KM (t) UCL	302.1			
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	410			
95% Adjusted Gamma UCL (Use when n < 40)	N/A					
Note: DL/2 is not a recommended method.	,					
		ovided to help the user to select the most appropriate 95% UCL.				
		ulation studies summarized in Singh, Maichle, and Lee (2006).				
For additional insight,	, the user m	ay want to consult a statistician.				

BENZO(A)PYRENE			
	General Stat	utietice	
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
Namber of Biolinet Beleeted Bata		Percent Non-Detects	66.67%
		1 dicentified Beload	00.07 /
Raw Statistics		Log-transformed Statistics	
Minimum Detected	86	Minimum Detected	4.454
Maximum Detected	140	Maximum Detected	4.942
Mean of Detected	113	Mean of Detected	4.698
SD of Detected	38.18	SD of Detected	0.345
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	400	Maximum Non-Detect	5.991
Note: Data have multiple DLs - Use of KM Method is recommen	ided	Number treated as Non-Detect	6
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	C
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warnin na Data		National Data and Malana	
		Distinct Detected Values.	
		ingful and reliable test statistics and estimates. es to estimate environmental parameters (e.g., EPC, BTV).	
The Project Team may decide to use alternative si	te specific value	es to estimate environmental parameters (e.g., EPC, BTV).	
Unione Data Overlity Objectives (DOOs)		it is suggested to collect additional observations.	
Offices Data Quality Objectives (DQOS)	lave been met,	, it is suggested to collect additional observations.	
The number of detected data may not be ad-	equate enough	to perform GOE tests, hootstrap, and ROS methods	
		to perform GOF tests, bootstrap, and ROS methods.	
		to perform GOF tests, bootstrap, and ROS methods. /alue on your output display!	
Those methods will	return a 'N/A' v	/alue on your output display!	
Those methods will  It is necessary to have 4	return a 'N/A' v	value on your output display!  oct Values for bootstrap methods.	
Those methods will  It is necessary to have 4 However, results obtaine	return a 'N/A' v or more Distind d using 4 to 9 d	value on your output display!  act Values for bootstrap methods.  distinct values may not be reliable.	
Those methods will  It is necessary to have 4 However, results obtaine	return a 'N/A' v or more Distind d using 4 to 9 d	value on your output display!  oct Values for bootstrap methods.	
Those methods will  It is necessary to have 4 However, results obtaine	return a 'N/A' v or more Distind d using 4 to 9 d	value on your output display!  act Values for bootstrap methods.  distinct values may not be reliable.	
Those methods will  It is necessary to have 4  However, results obtaine  It is recommended to have 10 to 15 or mor	return a 'N/A' v or more Distinct d using 4 to 9 d e observations UCL Statis	value on your output display!  act Values for bootstrap methods.  distinct values may not be reliable.  for accurate and meaningful results and estimates.	
Those methods will  It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor	return a 'N/A' v or more Distinct d using 4 to 9 d e observations  UCL Statis	value on your output display!  oct Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only	
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	return a 'N/A' v lor more Distind d using 4 to 9 d e observations  UCL Statis	value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	return a 'N/A' v or more Distinct d using 4 to 9 d e observations  UCL Statis	ralue on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	return a 'N/A' v lor more Distind d using 4 to 9 d e observations  UCL Statis	value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	return a 'N/A' v lor more Distind d using 4 to 9 d e observations  UCL Statis // N/A	value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level	N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution	return a 'N/A' v lor more Distind d using 4 to 9 d e observations  UCL Statis // N/A	ralue on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	return a 'N/A' v or more Distinct d using 4 to 9 d e observations  UCL Statis N/A N/A	value on your output display!  Act Values for bootstrap methods.  distinct values may not be reliable.  for accurate and meaningful results and estimates.  Stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	return a 'N/A' v or more Distinct d using 4 to 9 d e observations  UCL Statis N/A N/A  156.8	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Assuming Lognormal Distribution Method  Mean	N/A N/A 5.022
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	return a 'N/A' v lor more Distinct d using 4 to 9 d e observations  UCL Statis / N/A N/A 156.8 39.73	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Assuming Lognormal Distribution Method  Mean  DD Ata not Lognormal Distribution Method  Mean  SD	N/A N/A 5.022 0.301
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	return a 'N/A' v or more Distinct d using 4 to 9 d e observations  UCL Statis N/A N/A  156.8	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Assuming Lognormal Distribution Method  Mean	N/A N/A 5.022
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	return a 'N/A' v lor more Distinct d using 4 to 9 d e observations  UCL Statis / N/A N/A 156.8 39.73 189.5	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL	N/A N/A 5.022 0.301
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' v lor more Distinct d using 4 to 9 d e observations  UCL Statis / N/A N/A 156.8 39.73	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method	5.022 0.301 214.2
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	return a 'N/A' v lor more Distinct d using 4 to 9 d e observations  UCL Statis / N/A N/A 156.8 39.73 189.5	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale	5.022 0.30 214.2
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' v lor more Distinct d using 4 to 9 d e observations  UCL Statis / N/A N/A 156.8 39.73 189.5	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD idstitution Methods.  Sitics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL	5.022 0.30 214.2
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' v lor more Distinct d using 4 to 9 d e observations  UCL Statis / N/A N/A 156.8 39.73 189.5	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale	5.022 0.30 214.2 N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' v lor more Distinct d using 4 to 9 d e observations  UCL Statis / N/A N/A 156.8 39.73 189.5	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  SD in Original Scale  SIdistics  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean in Original Scale  SD in Original Scale	5.022 0.30 214.2 N/A N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' v lor more Distinct d using 4 to 9 d e observations  UCL Statis / N/A N/A 156.8 39.73 189.5	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  95% t UCL	5.022 0.30 214.2 N/A N/A N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' v lor more Distinct d using 4 to 9 d e observations  UCL Statis / N/A N/A 156.8 39.73 189.5	Assuming Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Original Scale  SD 95% t UCL  95% Percentile Bootstrap Uck	5.022 0.30 214.2 N/A N/A N/A N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' v lor more Distinct d using 4 to 9 d e observations  UCL Statis / N/A N/A 156.8 39.73 189.5	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  95% t UCL	5.022 0.30 214.2 N/A N/A N/A N/A

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only				
k star (bias corrected) N/A		Data do not follow a Discernable Distribution (0.05)				
Theta Star	N/A					
nu star	N/A					
A-D Test Statistic	N/A	Nonparametric Statistics				
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method				
K-S Test Statistic	N/A	Mean	1			
5% K-S Critical Value	N/A	SD	2			
Data not Gamma Distributed at 5% Significance Leve	I	SE of Mean	2			
		95% KM (t) UCL	167			
Assuming Gamma Distribution		95% KM (z) UCL	157			
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	183			
Minimum	N/A	95% KM (bootstrap t) UCL	N/A			
Maximum	N/A	95% KM (BCA) UCL	N/A			
Mean	N/A	95% KM (Percentile Bootstrap) UCL	14			
Median	N/A	95% KM (Chebyshev) UCL	230			
SD	N/A	97.5% KM (Chebyshev) UCL	281			
k star	N/A	99% KM (Chebyshev) UCL	381			
Theta star	N/A	, ,				
Nu star	N/A	Potential UCLs to Use				
AppChi2	N/A	95% KM (t) UCL	167			
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	14			
95% Adjusted Gamma UCL (Use when n < 40)	N/A					
Warning: Recommend	led UCL exce	eds the maximum observation				
L/2 is not a recommended method.						
Note: Suggestions regarding the selection of a 95% t	JCL are provi	ded to help the user to select the most appropriate 95% UCL.				
These recommendations are based upon the results	of the simula	ation studies summarized in Singh, Maichle, and Lee (2006).				
For additional insight,	the user may	want to consult a statistician.				

BENZO(B)FLUORANTHENE			
	General Sta	itistics	
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
		Percent Non-Detects	66.67%
Dow Statistics		Log two persons of Chatication	
Raw Statistics  Minimum Detected	230	Log-transformed Statistics Minimum Detected	5.438
Maximum Detected	410	Maximum Detected	6.016
Mean of Detected	320	Mean of Detected	5.727
SD of Detected	127.3	SD of Detected	0.409
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	400	Maximum Non-Detect	5.99
Note: Data have multiple DLs - Use of KM Method is recommen	ided	Number treated as Non-Detect	Ę
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	83.33%
Warning: Data	eet has only 2 F	Distinct Detected Values.	
		ingful and reliable test statistics and estimates.	
		es to estimate environmental parameters (e.g., EPC, BTV).	
The Fregor Fount may decide to dee diternative of	to opcomo vara	oo to commute crivilerimental parameters (c.g., Er e, B. v).	
Unless Data Quality Objectives (DQOs) I	nave been met.	, it is suggested to collect additional observations.	
The number of detected data may not be ad-		to perform GOF tests, bootstrap, and ROS methods.	
	equate enough		
Those methods will	equate enough return a 'N/A' v	to perform GOF tests, bootstrap, and ROS methods. value on your output display!	
Those methods will  It is necessary to have 4	equate enough return a 'N/A' v	to perform GOF tests, bootstrap, and ROS methods. value on your output display! act Values for bootstrap methods.	
Those methods will  It is necessary to have 4 However, results obtaine	equate enough return a 'N/A' v or more Distin d using 4 to 9 d	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable.	
Those methods will  It is necessary to have 4 However, results obtaine	equate enough return a 'N/A' v or more Distin d using 4 to 9 d	to perform GOF tests, bootstrap, and ROS methods. value on your output display! act Values for bootstrap methods.	
Those methods will  It is necessary to have 4 However, results obtaine	equate enough return a 'N/A' v or more Distin d using 4 to 9 d	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable.	
Those methods will  It is necessary to have 4 However, results obtaine	equate enough return a 'N/A' v or more Distin d using 4 to 9 d	to perform GOF tests, bootstrap, and ROS methods.  value on your output display!  nct Values for bootstrap methods.  distinct values may not be reliable.  for accurate and meaningful results and estimates.	
Those methods will  It is necessary to have 4 However, results obtaine	equate enough return a 'N/A' v or more Distin d using 4 to 9 d e observations	to perform GOF tests, bootstrap, and ROS methods.  value on your output display!  nct Values for bootstrap methods.  distinct values may not be reliable.  for accurate and meaningful results and estimates.	y
Those methods will  It is necessary to have 4  However, results obtaine  It is recommended to have 10 to 15 or mor	equate enough return a 'N/A' v or more Distin d using 4 to 9 d e observations	to perform GOF tests, bootstrap, and ROS methods.  value on your output display!  nct Values for bootstrap methods.  distinct values may not be reliable.  for accurate and meaningful results and estimates.	y N/A
Those methods will  It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor	equate enough return a 'N/A' v or more Distin d using 4 to 9 d e observations	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	equate enough return a 'N/A' velor more Distind using 4 to 9 de observations  UCL Statis	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	equate enough return a 'N/A' velor more Distind using 4 to 9 de observations  UCL Statis	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level	N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution	equate enough return a 'N/A' velor more Distind using 4 to 9 de observations  UCL Statis	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	equate enough return a 'N/A' v	to perform GOF tests, bootstrap, and ROS methods.  value on your output display!  act Values for bootstrap methods.  distinct values may not be reliable.  for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	equate enough return a 'N/A' videor more Distind using 4 to 9 de observations  UCL Statist  N/A  N/A  N/A  225.8	to perform GOF tests, bootstrap, and ROS methods.  value on your output display!  act Values for bootstrap methods.  distinct values may not be reliable.  for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean	N/A N/A 5.365
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	equate enough return a 'N/A' value or more Distinct dusing 4 to 9 de observations  UCL Statism N/A N/A N/A 225.8 93.24	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	N/A N/A 5.365 0.341
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	equate enough return a 'N/A' videor more Distind using 4 to 9 de observations  UCL Statist  N/A  N/A  N/A  225.8	to perform GOF tests, bootstrap, and ROS methods.  value on your output display!  act Values for bootstrap methods.  distinct values may not be reliable.  for accurate and meaningful results and estimates.  stics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean	N/A N/A 5.365
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	equate enough return a 'N/A' value or more Distinct dusing 4 to 9 de observations  UCL Statism N/A N/A N/A 225.8 93.24 302.5	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  Stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	N/A N/A 5.365 0.34
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	equate enough return a 'N/A' value or more Distinct dusing 4 to 9 de observations  UCL Statism N/A N/A N/A 225.8 93.24	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  Stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	5.365 0.34 321.6
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	equate enough return a 'N/A' value or more Distinct dusing 4 to 9 de observations  UCL Statism N/A N/A N/A 225.8 93.24 302.5	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  Stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale	5.369 0.34 321.6
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	equate enough return a 'N/A' value or more Distinct dusing 4 to 9 de observations  UCL Statism N/A N/A N/A 225.8 93.24 302.5	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  Stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	5.36 0.34 321.0
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	equate enough return a 'N/A' value or more Distinct dusing 4 to 9 de observations  UCL Statism N/A N/A N/A 225.8 93.24 302.5	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  Stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Log Scale Mean in Original Scale	5.36 0.34 321.0 N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	equate enough return a 'N/A' value or more Distinct dusing 4 to 9 de observations  UCL Statism N/A N/A N/A 225.8 93.24 302.5	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  Stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	5.369 0.34 321.6 N/A N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	equate enough return a 'N/A' value or more Distinct dusing 4 to 9 de observations  UCL Statism N/A N/A N/A 225.8 93.24 302.5	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  Stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale SD in Original Scale	5.369 0.34 321.6 N/A N/A N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	equate enough return a 'N/A' value or more Distinct dusing 4 to 9 de observations  UCL Statism N/A N/A N/A 225.8 93.24 302.5	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  Stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL 95% Percentile Bootstrap UCL	5.365 0.34 321.6 N/A N/A N/A N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	equate enough return a 'N/A' value or more Distinct dusing 4 to 9 de observations  UCL Statism N/A N/A N/A 225.8 93.24 302.5	to perform GOF tests, bootstrap, and ROS methods. value on your output display!  act Values for bootstrap methods. distinct values may not be reliable. for accurate and meaningful results and estimates.  Stics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale SD in Original Scale	N/A N/A 5.36 0.34 321 N/A N/A N/A

BENZO(B)FLUORANTHENE (Continued)			
Gamma Distribution Test with Detected Values Only	у	Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	260
5% K-S Critical Value	N/A	SD	67.08
Data not Gamma Distributed at 5% Significance Lev	el	SE of Mean	38.73
		95% KM (t) UCL	338
Assuming Gamma Distribution		95% KM (z) UCL	323.7
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	400.7
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	410
Mean	N/A	95% KM (Percentile Bootstrap) UCL	410
Median	N/A	95% KM (Chebyshev) UCL	428.8
SD	N/A	97.5% KM (Chebyshev) UCL	501.9
k star	N/A	99% KM (Chebyshev) UCL	645.4
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	338
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	410
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
lote: DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insigh	t, the user m	ay want to consult a statistician.	

CHRYSENE			
	General Statis	stics	
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
		Percent Non-Detects	66.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	120	Minimum Detected	4.787
Maximum Detected	420	Maximum Detected	6.04
Mean of Detected	270	Mean of Detected	5.414
SD of Detected	212.1	SD of Detected	0.886
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	400	Maximum Non-Detect	5.991
Note: Data bases and birds Disc. Has of I/M Mathed in management	- d - d	Number the standard on New Detect	
Note: Data have multiple DLs - Use of KM Method is recommen	naea	Number treated as Non-Detect	5
For all methods (except KM, DL/2, and ROS Methods), Observations < Largest ND are treated as NDs		Number treated as Detected	83.33%
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	63.33%
Warning: Data s	set has only 2 Dis	stinct Detected Values.	
		gful and reliable test statistics and estimates.	
		s to estimate environmental parameters (e.g., EPC, BTV).	
Unless Data Quality Objectives (DQOs) I	have been met, it	t is suggested to collect additional observations.	
		o perform GOF tests, bootstrap, and ROS methods.	
		o perform GOF tests, bootstrap, and ROS methods. slue on your output display!	
Those methods will	return a 'N/A' va	alue on your output display!	
Those methods will  It is necessary to have 4	return a 'N/A' va	alue on your output display!  t Values for bootstrap methods.	
Those methods will  It is necessary to have 4 However, results obtaine	return a 'N/A' va for more Distinct d using 4 to 9 dis	alue on your output display!  t Values for bootstrap methods. stinct values may not be reliable.	
Those methods will  It is necessary to have 4 However, results obtaine	return a 'N/A' va for more Distinct d using 4 to 9 dis	alue on your output display!  t Values for bootstrap methods.	
Those methods will  It is necessary to have 4 However, results obtaine	return a 'N/A' va for more Distinct d using 4 to 9 dis	alue on your output display!  t Values for bootstrap methods. stinct values may not be reliable.	
Those methods will  It is necessary to have 4  However, results obtaine  It is recommended to have 10 to 15 or mor	return a 'N/A' va for more Distinct d using 4 to 9 dis re observations for UCL Statisti	alue on your output display!  It Values for bootstrap methods.  It values for bootstrap methods.  It values for bootstrap methods.  It values for bootstrap methods.  It values for bootstrap methods.  It values for bootstrap methods.	
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor	return a 'N/A' va	alue on your output display!  It Values for bootstrap methods. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values only the values on values	
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	I return a 'N/A' va I or more Distinct d using 4 to 9 distre observations for UCL Statistic	alue on your output display!  It Values for bootstrap methods. Istinct values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values only the values only shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	return a 'N/A' va	alue on your output display!  It Values for bootstrap methods. Istinct values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values only shapiro Wilk Test Statistic It values only shapiro Wilk Test Statistic It values only shapiro Wilk Critical Values only shapiro Wilk Critical Values only shapiro Wilk Critical Values	
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	I return a 'N/A' va I or more Distinct d using 4 to 9 distre observations for UCL Statistic	alue on your output display!  It Values for bootstrap methods. Istinct values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values only the values only shapiro Wilk Test Statistic	N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	I return a 'N/A' va I or more Distinct d using 4 to 9 distre observations for UCL Statistic	alue on your output display!  It Values for bootstrap methods. Istinct values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values only shapiro Wilk Test Statistic It values only shapiro Wilk Test Statistic It values only shapiro Wilk Critical Values only shapiro Wilk Critical Values only only shapiro Wilk Critical Values only only shapiro Wilk Critical Values only only shapiro Wilk Critical Values only only shapiro Wilk Critical Values only only only only only only only only	N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution	I return a 'N/A' va I or more Distinct d using 4 to 9 distre observations for UCL Statistic	alue on your output display!  It Values for bootstrap methods. Istinct values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values and estimates.  It values only It values o	N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	I return a 'N/A' va I or more Distinct d using 4 to 9 distre observations for UCL Statistic N/A N/A	alue on your output display!  It Values for bootstrap methods. Istinct values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values only shapiro Wilk Test Statistic It values only shapiro Wilk Test Statistic It values only shapiro Wilk Critical Values only shapiro Wilk Critical Values only only shapiro Wilk Critical Values only only shapiro Wilk Critical Values only only shapiro Wilk Critical Values only only shapiro Wilk Critical Values only only only only only only only only	N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	return a 'N/A' va  for more Distinct d using 4 to 9 dis re observations for  UCL Statisti // N/A N/A  209.2	alue on your output display!  It Values for bootstrap methods. Istinct values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values and estimates.  It values only It values o	N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	I return a 'N/A' va I or more Distinct d using 4 to 9 distre observations for UCL Statistic N/A N/A	Assuming Lognormal Distribution  At Values for bootstrap methods.  Stinct values may not be reliable.  For accurate and meaningful results and estimates.  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	N/A N/A 5.26 0.418
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or more  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	return a 'N/A' va  for more Distinct d using 4 to 9 dis re observations for  UCL Statist / N/A N/A N/A 209.2 106.6	alue on your output display!  It Values for bootstrap methods. Istinct values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values may not be reliable. It values and estimates.  It values only It values o	N/A N/A 5.26 0.418
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	return a 'N/A' va  for more Distinct d using 4 to 9 dis re observations for  UCL Statist / N/A N/A N/A 209.2 106.6	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method	N/A N/A 5.26 0.418
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Statisti N/A N/A N/A 209.2 106.6 296.8	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale	N/A N/A 5.26 0.418 332.6
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti N/A N/A N/A 209.2 106.6 296.8	Assuming Lognormal Distribution  Data not Lognormal Distribution  Data not Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Static Values Construction  Static Values Construction  Static Values Construction  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale	5.26 0.418 332.6 N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti N/A N/A N/A 209.2 106.6 296.8	Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale	5.26 0.418 332.6 N/A N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti N/A N/A N/A 209.2 106.6 296.8	Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  Statical Value  Statical Value  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean in Original Scale  SD in Original Scale	5.26 0.418 332.6 N/A N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti N/A N/A N/A 209.2 106.6 296.8	Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Original Scale  Stinct Values may not be reliable.  Stics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Original Scale  SD in Original Scale	5.26 0.418 332.6 N/A N/A N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti N/A N/A N/A 209.2 106.6 296.8	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Original Scale  SD in Original Scale  95% t UCL  95% Percentile Bootstrap UCL	5.26 0.418 332.6 N/A N/A N/A N/A N/A
It is necessary to have 4 However, results obtaine It is recommended to have 10 to 15 or mor  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti N/A N/A N/A 209.2 106.6 296.8	Assuming Lognormal Distribution  Data not Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Original Scale  Stinct Values may not be reliable.  Stics  Lognormal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Original Scale  SD in Original Scale	5.26 0.418 332.6 N/A N/A N/A N/A

CHRYSENE (Continued)							
Gamma Distribution Test with Detected Values Only	<u> </u>	Data Distribution Test with Detected Values Only					
ř	N/A	Data do not follow a Discernable Distribution (0.05)					
k star (bias corrected)	N/A N/A	Data do not follow a Discernable Distribution (0.05)					
Theta Star							
nu star	N/A						
A-D Test Statistic	N/A	Nonparametric Statistics					
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method					
K-S Test Statistic	N/A	Mean	170				
5% K-S Critical Value	N/A	SD	111.8				
Data not Gamma Distributed at 5% Significance Leve	əl	SE of Mean	64.55				
		95% KM (t) UCL	300.1				
Assuming Gamma Distribution		95% KM (z) UCL	276.2				
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	404.5				
Minimum	N/A	95% KM (bootstrap t) UCL	170				
Maximum	N/A	95% KM (BCA) UCL	420				
Mean	N/A	95% KM (Percentile Bootstrap) UCL	N/A				
Median	N/A	95% KM (Chebyshev) UCL	451.4				
SD	N/A	97.5% KM (Chebyshev) UCL	573.1				
k star	N/A	99% KM (Chebyshev) UCL	812.3				
Theta star	N/A						
Nu star	N/A	Potential UCLs to Use					
AppChi2	N/A	95% KM (t) UCL	300.1				
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	N/A				
95% Adjusted Gamma UCL (Use when n < 40)	N/A	, , , , , , , , , , , , , , , , , , ,					
Note: DL/2 is not a recommended method.							
		ovided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the result	s of the sim	ulation studies summarized in Singh, Maichle, and Lee (2006).					
For additional insight	t, the user m	nay want to consult a statistician.					

	General UCL Statistics for	or Full Data S	Sets	
User Selected Options				
From File		Newport\De	recktor\Draft Final Risk Assessment\EPCs\Surface Soil - Centra	I Shipvard
Full Precision	OFF	•		
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
ALUMINUM				
		General S		
Nun	nber of Valid Observations	6	Number of Distinct Observations 6	6
Raws	Statistics		Log-transformed Statistics	
	Minimum	5820	Minimum of Log Data 8	3.669
	Maximum		Maximum of Log Data 9	
		10850	Mean of log Data 9	
	Geometric Mean		SD of log Data 0	
	Median		SD 01 log Data (	,,
		3098		
	Std. Error of Mean			
	Coefficient of Variation			
	Skewness			
lt is	suggested to collect at lea	st 8 to 10 obs	compute meaningful and reliable test statistics and estimates! servations using these statistical methods! res (DQO) based sample size and analytical results.	
Note: It s	hould be noted that even t	hough bootst	ly 6 Values in this data rap methods may be performed on this data set,	
	the resulting calculations	s may not be	reliable enough to draw conclusions	
The literatur			n data sets having more than 10-15 observations.	
	e suggests to use bootstra	ap methods o	in data sets flaving more than 10-10 observations.	
	e suggests to use bootstra		•	
Normal Dis		Relevant UC	CL Statistics	
	stribution Test	Relevant UC	CL Statistics  Lognormal Distribution Test	774
,	stribution Test Shapiro Wilk Test Statistic	Relevant UC	CL Statistics  Lognormal Distribution Test  Shapiro Wilk Test Statistic [0]	
	stribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value	Relevant UC	Lognormal Distribution Test Shapiro Wilk Test Statistic C Shapiro Wilk Critical Value C	
	stribution Test Shapiro Wilk Test Statistic	Relevant UC	CL Statistics  Lognormal Distribution Test  Shapiro Wilk Test Statistic [0]	
Data appear Normal a	stribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level	Relevant UC	Lognormal Distribution Test  Shapiro Wilk Test Statistic C  Shapiro Wilk Critical Value C  Data not Lognormal at 5% Significance Level	
Data appear Normal a	stribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level	0.795 0.788	Lognormal Distribution Test Shapiro Wilk Test Statistic C Shapiro Wilk Critical Value C Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution	).788
Data appear Normal a Assuming No	stribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level rmal Distribution 95% Student's-t UCL	0.795 0.788	Lognormal Distribution Test Shapiro Wilk Test Statistic C Shapiro Wilk Critical Value C Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution 95% H-UCL 1	).788 15547
Data appear Normal a  Assuming No  95% UCLs (Adji	stribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level at Distribution 95% Student's-t UCL usted for Skewness)	0.795 0.788	Lognormal Distribution Test Shapiro Wilk Test Statistic C Shapiro Wilk Critical Value C Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution 95% H-UCL 1 95% Chebyshev (MVUE) UCL 1	15547 17433
Data appear Normal a  Assuming No  95% UCLs (Adji 95% Adjust	stribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level rmal Distribution 95% Student's-t UCL	0.795 0.788 13399	Lognormal Distribution Test Shapiro Wilk Test Statistic C Shapiro Wilk Critical Value C Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution 95% H-UCL 1	0.788 15547 17433 20260

Gamma Distribution Test		Data Distribution					
k star (bias corrected)	6.09		Data appear Nor	mal at	5% Signific	ance Level	
Theta Star							
MLE of Mean	10850						
MLE of Standard Deviation	4397						
nu star	73.08						
Approximate Chi Square Value (.05)	54.4		Nonpa	aramet	ric Statistics	3	
Adjusted Level of Significance	0.0122				9!	5% CLT UCL	12931
Adjusted Chi Square Value	48.62				95% Ja	ackknife UCL	13399
				95%	Standard Bo	ootstrap UCL	12736
Anderson-Darling Test Statistic	0.738				95% Boo	otstrap-t UCL	12836
Anderson-Darling 5% Critical Value	0.698			9	5% Hall's Bo	ootstrap UCL	12135
Kolmogorov-Smirnov Test Statistic						ootstrap UCL	
Kolmogorov-Smirnov 5% Critical Value	0.332					ootstrap UCL	
Data not Gamma Distributed at 5% Significance Lev	vel					an, Sd) UCL	
						an, Sd) UCL	
Assuming Gamma Distribution			99	9% Ch	ebyshev(Me	an, Sd) UCL	23436
95% Approximate Gamma UCL (Use when n >= 40)							
95% Adjusted Gamma UCL (Use when n < 40)	16309						
Potential UCL to Use				ι	lse 95% Stu	ident's-t UCL	13399
Recommended	UCL exceed	ds the maxim	um observation				
Note: Suggestions regarding the selection of a 95%	UCL are pr	ovided to hel	p the user to select	t the m	ost appropr	iate 95% UC	L.
These recommendations are based upon the res						d laci (2002)	
and Singh and Singh (2003). For	additional in:	sight, the use	er may want to cons	sult a s	tatistician.		
			confidence limits				
			mma) may not be				
		hnson's meth					
adjustme	ents for posity	vely skewed	data sets.				

IC			
	General	Statistics	
Number of Valid Observations		Number of Distinct Observations	6
Raw Statistics		Log-transformed Statistics	
Minimum		Minimum of Log Data	
Maximum		Maximum of Log Data	
Mean Geometric Mean		Mean of log Data SD of log Data	
Median		SD 01 log Data	0.61
	9.169		
Std. Error of Mean			
Coefficient of Variation			
Skewness	-0.774		
It is suggested to collect at lea	st 8 to 10 ol	o compute meaningful and reliable test statistics and estimates!  Discryptions using these statistical methods!	
Warning: Note: It should be noted that even t	There are o	ives (DQO) based sample size and analytical results.  nly 6 Values in this data strap methods may be performed on this data set, e reliable enough to draw conclusions	
The literature suggests to use bootstra	ap methods	on data sets having more than 10-15 observations.	
	Relevant U	CL Statistics	
Normal Distribution Test	0.044	Lognormal Distribution Test	0.70
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Level	0.788	Shapiro Wilk Critical Value  Data not Lognormal at 5% Significance Level	0.78
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	23.7	95% H-UCL	66
95% UCLs (Adjusted for Skewness)	20.7	95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)	21.05	97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL	
Gamma Distribution Test		Data Distribution	
k star (bias corrected)		Data appear Normal at 5% Significance Level	
Theta Star			
MLE of Mean			
MLE of Standard Deviation			
nu star Approximate Chi Square Value (.05)		Nonparametric Statistics	
Approximate Crit Square value (.05) Adjusted Level of Significance		95% CLT UCL	22.3
Adjusted Level of Significance Adjusted Chi Square Value		95% Jackknife UCL	
/ Mjastou Offi Oqualo Value	0.02	95% Standard Bootstrap UCL	
Anderson-Darling Test Statistic	0.77	95% Bootstrap-t UCL	
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL	
Anderson-Daning 570 Childar Value		95% Percentile Bootstrap UCL	
Kolmogorov-Smirnov Test Statistic	0.357		
		95% BCA Bootstrap UCL	21.1
Kolmogorov-Smirnov Test Statistic	0.335	95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	0.335		32.4
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data not Gamma Distributed at 5% Significance Lev Assuming Gamma Distribution	0.335 rel	95% Chebyshev(Mean, Sd) UCL	32.4 39.5
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data not Gamma Distributed at 5% Significance Lev  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	0.335 rel	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	32.4 39.5
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data not Gamma Distributed at 5% Significance Lev Assuming Gamma Distribution	0.335 rel	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	32.4 39.5
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data not Gamma Distributed at 5% Significance Lev  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	0.335 rel	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	32.4 39.5 53.4
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data not Gamma Distributed at 5% Significance Lev  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For a	0.335 rel 32.63 43.17  UCL are prults of the sadditional in	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL Use 95% Student's-t UCL ovided to help the user to select the most appropriate 95% UCL imulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.	32.4 39.5 53.4 23.7
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data not Gamma Distributed at 5% Significance Lev  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For a	0.335 rel 32.63 43.17  UCL are prults of the sadditional in	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL Use 95% Student's-t UCL ovided to help the user to select the most appropriate 95% UCL imulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.  Kewed data, confidence limits	32.4 39.5 53.4 23.7
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data not Gamma Distributed at 5% Significance Lev  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For a	0.335 rel 32.63 43.17  UCL are proposed to the selectional in regative-slason, Logno	95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL Use 95% Student's-t UCL ovided to help the user to select the most appropriate 95% UCL imulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.	32.4 39.5 53.4 23.7

General S	Statistics
Number of Valid Observations 6	Number of Distinct Observations 6
Raw Statistics	Log-transformed Statistics
Minimum 9.8	Minimum of Log Data 2
Maximum 18.2	Maximum of Log Data 2
Mean 14.53	Mean of log Data 2
Geometric Mean 14.18	SD of log Data 0.
Median 15.7	
SD 3.353	
Std. Error of Mean 1.369	
Coefficient of Variation 0.231	
Skewness -0.684	
Warning: A sample size of 'n' = 6 may not adequate enough to	compute meaningful and reliable test statistics and estimates
Warning. A sample size of 11 – 6 may not adequate enough to	compute meaningful and reliable test statistics and estimates:
It is suggested to collect at least 8 to 10 obs	
If possible compute and collect Data Quality Objective	es (DQO) based sample size and analytical results.
147 1 991 1	
Warning: There are onl	
Note: It should be noted that even though bootstr	
the resulting calculations may not be	reliable enough to draw conclusions
The literature suggests to use bootstrap methods or	n data sets having more than 10-15 observations.
1	•
Relevant UC	L Statistics
Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic 0.883	Shapiro Wilk Test Statistic 0.
Shapiro Wilk Critical Value 0.788	Shapiro Wilk Critical Value 0.
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution	Assuming Lognormal Distribution
95% Student's-t UCL 17.29	95% H-UCL 18
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL 2
95% Adjusted-CLT UCL (Chen-1995) 16.38	97.5% Chebyshev (MVUE) UCL 2
95% Modified-t UCL (Johnson-1978) 17.23	99% Chebyshev (MVUE) UCL 29
Gamma Distribution Test	Data Distribution
k star (bias corrected) 10.31	Data appear Normal at 5% Significance Level
Theta Star 1.41	
MLE of Mean 14.53	
MLE of Standard Deviation 4.527	
nu star 123.7	N O
Approximate Chi Square Value (.05) 99.01	Nonparametric Statistics
Adjusted Level of Significance 0.0122	95% CLT UCL 1
	95% Jackknife UCL 1
Adjusted Level of Significance 0.0122 Adjusted Chi Square Value 91.04	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1
Adjusted Level of Significance 0.0122 Adjusted Chi Square Value 91.04  Anderson-Darling Test Statistic 0.527	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1
Adjusted Level of Significance 0.0122 Adjusted Chi Square Value 91.04  Anderson-Darling Test Statistic 0.527 Anderson-Darling 5% Critical Value 0.697	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1
Adjusted Level of Significance 0.0122 Adjusted Chi Square Value 91.04  Anderson-Darling Test Statistic 0.527 Anderson-Darling 5% Critical Value 0.697 Kolmogorov-Smirnov Test Statistic 0.321	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1
Adjusted Level of Significance 0.0122 Adjusted Chi Square Value 91.04  Anderson-Darling Test Statistic 0.527 Anderson-Darling 5% Critical Value 0.697 Kolmogorov-Smirnov Test Statistic 0.321 Kolmogorov-Smirnov 5% Critical Value 0.332	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1
Adjusted Level of Significance 0.0122 Adjusted Chi Square Value 91.04  Anderson-Darling Test Statistic 0.527 Anderson-Darling 5% Critical Value 0.697 Kolmogorov-Smirnov Test Statistic 0.321 Kolmogorov-Smirnov 5% Critical Value 0.332	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance 0.0122 Adjusted Chi Square Value 91.04  Anderson-Darling Test Statistic 0.527 Anderson-Darling 5% Critical Value 0.697 Kolmogorov-Smirnov Test Statistic 0.321 Kolmogorov-Smirnov 5% Critical Value 0.332  Data appear Gamma Distributed at 5% Significance Level	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance 0.0122 Adjusted Chi Square Value 91.04  Anderson-Darling Test Statistic 0.527 Anderson-Darling 5% Critical Value 0.697 Kolmogorov-Smirnov Test Statistic 0.321 Kolmogorov-Smirnov 5% Critical Value 0.332  Data appear Gamma Distributed at 5% Significance Level  Assuming Gamma Distribution	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance   0.0122   Adjusted Chi Square Value   91.04    Anderson-Darling Test Statistic   0.527   Anderson-Darling 5% Critical Value   0.697   Kolmogorov-Smirnov Test Statistic   0.321   Kolmogorov-Smirnov 5% Critical Value   0.332   Data appear Gamma Distributed at 5% Significance Level    Assuming Gamma Distribution   95% Approximate Gamma UCL (Use when n >= 40)   18.16	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance   0.0122   Adjusted Chi Square Value   91.04    Anderson-Darling Test Statistic   0.527   Anderson-Darling 5% Critical Value   0.697   Kolmogorov-Smirnov Test Statistic   0.321   Kolmogorov-Smirnov 5% Critical Value   0.332   Data appear Gamma Distributed at 5% Significance Level    Assuming Gamma Distribution	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance   0.0122   Adjusted Chi Square Value   91.04    Anderson-Darling Test Statistic   0.527   Anderson-Darling 5% Critical Value   0.697   Kolmogorov-Smirnov Test Statistic   0.321   Kolmogorov-Smirnov 5% Critical Value   0.332   Data appear Gamma Distributed at 5% Significance Level    Assuming Gamma Distribution   95% Approximate Gamma UCL (Use when n >= 40)   18.16   95% Adjusted Gamma UCL (Use when n < 40)   19.75	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance   0.0122   Adjusted Chi Square Value   91.04    Anderson-Darling Test Statistic   0.527   Anderson-Darling 5% Critical Value   0.697   Kolmogorov-Smirnov Test Statistic   0.321   Kolmogorov-Smirnov 5% Critical Value   0.332   Data appear Gamma Distributed at 5% Significance Level    Assuming Gamma Distribution   95% Approximate Gamma UCL (Use when n >= 40)   18.16	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance   0.0122   Adjusted Chi Square Value   91.04    Anderson-Darling Test Statistic   0.527   Anderson-Darling 5% Critical Value   0.697   Kolmogorov-Smirnov Test Statistic   0.321   Kolmogorov-Smirnov 5% Critical Value   0.332   Data appear Gamma Distributed at 5% Significance Level    Assuming Gamma Distribution   95% Approximate Gamma UCL (Use when n >= 40)   18.16   95% Adjusted Gamma UCL (Use when n < 40)   19.75    Potential UCL to Use	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance   0.0122   Adjusted Chi Square Value   91.04    Anderson-Darling Test Statistic   0.527   Anderson-Darling 5% Critical Value   0.697   Kolmogorov-Smirnov Test Statistic   0.321   Kolmogorov-Smirnov 5% Critical Value   0.332   Data appear Gamma Distributed at 5% Significance Level    Assuming Gamma Distribution   95% Approximate Gamma UCL (Use when n >= 40)   18.16   95% Adjusted Gamma UCL (Use when n < 40)   19.75    Potential UCL to Use    Note: Suggestions regarding the selection of a 95% UCL are proving the selection of a 95	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance   0.0122   Adjusted Chi Square Value   91.04    Anderson-Darling Test Statistic   0.527   Anderson-Darling 5% Critical Value   0.697   Kolmogorov-Smirnov Test Statistic   0.321   Kolmogorov-Smirnov 5% Critical Value   0.332   Data appear Gamma Distributed at 5% Significance Level    Assuming Gamma Distribution   95% Approximate Gamma UCL (Use when n >= 40)   18.16   95% Adjusted Gamma UCL (Use when n < 40)   19.75    Potential UCL to Use    Note: Suggestions regarding the selection of a 95% UCL are protested from the simulation of the simulation in th	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance   0.0122   Adjusted Chi Square Value   91.04    Anderson-Darling Test Statistic   0.527   Anderson-Darling 5% Critical Value   0.697   Kolmogorov-Smirnov Test Statistic   0.321   Kolmogorov-Smirnov 5% Critical Value   0.332   Data appear Gamma Distributed at 5% Significance Level    Assuming Gamma Distribution   95% Approximate Gamma UCL (Use when n >= 40)   18.16   95% Adjusted Gamma UCL (Use when n < 40)   19.75    Potential UCL to Use    Note: Suggestions regarding the selection of a 95% UCL are protested the sime and Singh and Singh (2003). For additional insi	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2 90% Chebyshev(Mean, Sd) UCL 2 90% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance   0.0122   Adjusted Chi Square Value   91.04    Anderson-Darling Test Statistic   0.527   Anderson-Darling 5% Critical Value   0.697   Kolmogorov-Smirnov Test Statistic   0.321   Kolmogorov-Smirnov 5% Critical Value   0.332   Data appear Gamma Distributed at 5% Significance Level    Assuming Gamma Distribution   95% Approximate Gamma UCL (Use when n >= 40)   18.16   95% Adjusted Gamma UCL (Use when n < 40)   19.75    Potential UCL to Use    Note: Suggestions regarding the selection of a 95% UCL are protected from the significance of the significance in the significance	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 1 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 2 99% Chebyshev(Mean, Sd) UCL 2
Adjusted Level of Significance 0.0122 Adjusted Chi Square Value 91.04  Anderson-Darling Test Statistic 0.527 Anderson-Darling 5% Critical Value 0.697 Kolmogorov-Smirnov Test Statistic 0.321 Kolmogorov-Smirnov 5% Critical Value 0.332  Data appear Gamma Distributed at 5% Significance Level  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 18.16 95% Adjusted Gamma UCL (Use when n < 40) 19.75  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% UCL are protested the simulation and Singh and Singh (2003). For additional insi	95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 11 95% Percentile Bootstrap UCL 11 95% BCA Bootstrap UCL 11 95% Chebyshev(Mean, Sd) UCL 20 97.5% Chebyshev(Mean, Sd) UCL 20 97.5% Chebyshev(Mean, Sd) UCL 20 99% Chebyshev(Mean, Sd) UC

Genera	I Statistics	
s 6	Number of Distinct Observations	5
	Log-transformed Statistics	
	SD 01 log Data	0.20
n 0.256		
s -0.739		
ast 8 to 10 o	bservations using these statistical methods!	
There are o	only 6 Values in this data strap methods may be performed on this data set,	
is may not b	e reliable enough to draw conclusions	
rap methods	on data sets having more than 10-15 observations.	
Relevant U		
- 0.022		0.00
; U./06		U./8
	Data appear Loynormar at 5% Significance Level	
	Assuming Lognormal Distribution	
14.58	95% H-UCL	16.0
	95% Chebyshev (MVUE) UCL	
) 13.71	97.5% Chebyshev (MVUE) UCL	20.7
) 14.51	99% Chebyshev (MVUE) UCL	25.8
	Data Blatch	
) 8 228		
	Data appear Normal at 3% Significance Level	
1 4.198		
r 98.74		
) 76.81	Nonparametric Statistics	
0.0122	95% CLT UCL	
e 69.85	95% Jackknife UCL	
0.601		
	·	
) 15.48	55 /6 Onebysite (weath, 5d) OCL	<u>_</u> -T.J
) 17.02		
	Use 95% Student's-t UCL	14.5
% UCL are n	rovided to help the user to select the most appropriate 95% UCL	
sults of the s	simulation studies summarized in Singh, Singh, and laci (2002) asight, the user may want to consult a statistician.	
sults of the s additional ir y negative-s	nsight, the user may want to consult a statistician. kewed data, confidence limits	
sults of the s additional ir y negative-s inson, Logno	nsight, the user may want to consult a statistician.	
	7.6 14.7 12.04 11.67 13.3 3.082 1.258 0.256 6-0.739  ate enough to uality Object There are continued by the series of though boots as may not be though bottom be though boots as may not be though boots as may not be though boots as may not be though boots as may not be though boots as may not be though boots as may not be though boots as may not be though boots as may not be though boots as may n	Log-transformed Statistics

	General	Statistics
Number of Valid Observations		Number of Distinct Observations 6
Raw Statistics		Log-transformed Statistics
Minimum	18500	Minimum of Log Data 9.8
Maximum		Maximum of Log Data 10
Mean	28033	Mean of log Data 10
Geometric Mean	27463	SD of log Data 0.2
Median		
	5783	
Std. Error of Mean		
Coefficient of Variation Skewness		
	!	compute meaningful and reliable test statistics and estimates!
		servations using these statistical methods!
If possible compute and collect Data Qu	ality Objecti	ves (DQO) based sample size and analytical results.
		nly 6 Values in this data
		trap methods may be performed on this data set,
the resulting calculations	s may not be	reliable enough to draw conclusions
The literature suggests to use bootstra	an methods	on data sets having more than 10-15 observations.
The moratare eaglests to all bestern	-	
	Relevant U	CL Statistics
Normal Distribution Test	0.700	Lognormal Distribution Test
Shapiro Wilk Test Statistic Shapiro Wilk Critical Value		Shapiro Wilk Test Statistic 0.7 Shapiro Wilk Critical Value 0.7
Data not Normal at 5% Significance Level	0.700	Data not Lognormal at 5% Significance Level
Data not Normal at 5 % Significance Level		Data not Lognornial at 5 % Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	32791	95% H-UCL 35
95% UCLs (Adjusted for Skewness)	•	95% Chebyshev (MVUE) UCL 39
95% Adjusted-CLT UCL (Chen-1995)		97.5% Chebyshev (MVUE) UCL 44
95% Modified-t UCL (Johnson-1978)	32597	99% Chebyshev (MVUE) UCL 54
Gamma Distribution Test		Data Distribution
k star (bias corrected)	12 36	Data do not follow a Discernable Distribution (0.05)
Theta Star		Data do not follow a Discernable Distribution (0.00)
MLE of Mean		
MLE of Standard Deviation	7975	
nu star	148.3	
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 31
Adjusted Chi Square Value	112.3	95% Jackknife UCL 32
Anderson Darling Took Chatlatia	0.70	95% Standard Bootstrap UCL 31 95% Bootstrap-t UCL 31
Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value		95% Bootstrap-t UCL 31
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 31
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 31
Data not Gamma Distributed at 5% Significance Lev		95% Chebyshev(Mean, Sd) UCL 38
		97.5% Chebyshev(Mean, Sd) UCL 42
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 51
95% Approximate Gamma UCL (Use when n >= 40)		
95% Adjusted Gamma UCL (Use when n < 40)	37027	
Potential UCL to Use		
		Use 95% Student's-t UCL 32 or 95% Modified-t UCL 32
1 Otermai COL to COC		ds the maximum observation
	UCL excee	
Recommended		
Recommended Note: Suggestions regarding the selection of a 95%	UCL are pr	ovided to help the user to select the most appropriate 95% UCL. mulation studies summarized in Singh, Singh, and laci (2002)
Recommended  Note: Suggestions regarding the selection of a 95%  These recommendations are based upon the res  and Singh and Singh (2003). For a	UCL are prults of the si additional in	ovided to help the user to select the most appropriate 95% UCL. mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.
Recommended Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For a	UCL are prults of the si additional in negative-sk	ovided to help the user to select the most appropriate 95% UCL. mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.
Recommended Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For a Note: For highly (e.g., Chen, John	UCL are prults of the siadditional in negative-skoon, Lognor	ovided to help the user to select the most appropriate 95% UCL. mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.

	Genera	l Statistics	
Number of Valid Observations	6	Number of Distinct Observations	6
Raw Statistics	007.5	Log-transformed Statistics	
Minimum		Minimum of Log Data	
Maximum Mean		Maximum of Log Data	
Geometric Mean		Mean of log Data SD of log Data	
Median		SD of log Data (	0.17
	65.3		
Std. Error of Mean			
Coefficient of Variation			
Skewness	-		
	_	o compute meaningful and reliable test statistics and estimates!	
If possible compute and collect Data Qu Warning:	iality Object There are c	chipse values is these statistical methods: tives (DQO) based sample size and analytical results. chipse Values in this data strap methods may be performed on this data set,	
		e reliable enough to draw conclusions	
The literature average to use heateter		an data ante havina mane than 10 15 ahaan satisma	
i ne literature suggests to use bootstra	ap metnods	on data sets having more than 10-15 observations.	
	Relevant I	JCL Statistics	
Normal Distribution Test	Tiolovanic	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.877	Shapiro Wilk Test Statistic	0.88
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
Data appear Normal at 5% Significance Level	1	Data appear Lognormal at 5% Significance Level	,
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	434.6	95% H-UCL	448
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)		97.5% Chebyshev (MVUE) UCL !	551.
95% Modified-t UCL (Johnson-1978)	434.3	99% Chebyshev (MVUE) UCL	652.
Gamma Distribution Test		Data Distribution	
k star (bias corrected)		Data appear Normal at 5% Significance Level	
Theta Star			
MLE of Mean			
MLE of Standard Deviation			
nu star		Managemental Constitution	
Approximate Chi Square Value (.05)		Nonparametric Statistics 95% CLT UCL	121
Adjusted Level of Significance Adjusted Chi Square Value		95% CET UCL 4	
Aujusteu Otti Squate Value	190.0	95% Standard Bootstrap UCL	
Anderson-Darling Test Statistic	0.442	95% Standard Bootstrap CCL 4	
Anderson-Darling 1981 Statistic		95% Hall's Bootstrap UCL	
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL	
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL	
Data appear Gamma Distributed at 5% Significance L		95% Chebyshev(Mean, Sd) UCL	
The second secon		97.5% Chebyshev(Mean, Sd) UCL	
Assuming Gamma Distribution	I .	99% Chebyshev(Mean, Sd) UCL	
95% Approximate Gamma UCL (Use when n >= 40)	445.6		
95% Adjusted Gamma UCL (Use when n < 40)			
- 1			
Potential UCL to Use		Use 95% Student's-t UCL	434.
	_	rovided to help the user to select the most appropriate 95% UCL	
Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res	ults of the s	simulation studies summarized in Singn, Singn, and laci (2002) sight, the user may want to consult a statistician.	
Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For	ults of the s additional in	nsight, the user may want to consult a statistician.	
Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For a	ults of the sadditional in negative-s	nsight, the user may want to consult a statistician. kewed data, confidence limits	
Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For a Note: For highly (e.g., Chen, John	ults of the s additional in negative-s nson, Logno	nsight, the user may want to consult a statistician.	

**Central Shipyard** 

**Subsurface Soil** 

	General UCL Statistics for	r Data Sets w	ith Non-Detects	
User Selected Options				
From File	C:\Work Folders\Projects\	Newport\Dere	cktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - Ce	ntral Shipya
Full Precision	OFF	-		
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
BENZO(A)ANTHRACENE				
	Number of Volid Date	General St		10
Niconalean	Number of Valid Data	10	Number of Detected Data	10 15
	of Distinct Detected Data		Number of Non-Detect Data	
r	lumber of Missing Values	19	Percent Non-Detects	60.00%
Raw S	tatistics		Log-transformed Statistics	
	Minimum Detected	47	Minimum Detected	3.85
	Maximum Detected	1300	Maximum Detected	7.17
	Mean of Detected	253.7	Mean of Detected	4.938
	SD of Detected	381.8	SD of Detected	1.02
	Minimum Non-Detect	340	Minimum Non-Detect	5.829
	Maximum Non-Detect	4000	Maximum Non-Detect	8.294
Note: Data have multiple DLs - Use of	of KM Method is recommen	ded	Number treated as Non-Detect	25
For all methods (except KM, DL/2, ar			Number treated as Detected	0
Observations < Largest ND are treate	ed as NDs		Single DL Non-Detect Percentage	100.00%
		UCL Stat	istics	
Normal Distribution Test	with Detected Values Only		Lognormal Distribution Test with Detected Values Onl	lv
	Shapiro Wilk Test Statistic	0.579	Shapiro Wilk Test Statistic	0.88
	hapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842
	5% Significance Level	0.0.2	Data appear Lognormal at 5% Significance Level	0.0.2
	•			
	mal Distribution		Assuming Lognormal Distribution	
	DL/2 Substitution Method		DL/2 Substitution Method	
	Mean	294.1	Mean	5.244
	SD	426.8	SD	0.82
	95% DL/2 (t) UCL	440.1	95% H-Stat (DL/2) UCL	388.2
Maximum Likelihoo	od Estimate(MLE) Method	N/A	Log ROS Method	
	to converge properly		Mean in Log Scale	4.778
	,		SD in Log Scale	0.694
			Mean in Original Scale	169.4
			SD in Original Scale	246
			95% t UCL	253.6
			95% Percentile Bootstrap UCL	259.9
			95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% H-UCL	259.9 303.1

BENZO(A)ANTHRACENE (Continued)	Т		
Gamma Distribution Test with Detected Values Onl	y	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.745	Data Follow Appr. Gamma Distribution at 5% Significance Lev	vel
Theta Star	340.6	1.	
nu star	14.9		
A-D Test Statistic	0.926	Nonparametric Statistics	
5% A-D Critical Value	0.749	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.749	Mean	177.7
5% K-S Critical Value	0.274	SD	251.8
Data follow Appr. Gamma Distribution at 5% Significance	Level	SE of Mean	58.52
		95% KM (t) UCL	277.8
Assuming Gamma Distribution		95% KM (z) UCL	273.9
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	276.5
Minimum	0.000001	95% KM (bootstrap t) UCL	403.1
Maximum	1300	95% KM (BCA) UCL	284.6
Mean	204	95% KM (Percentile Bootstrap) UCL	278
Median	168	95% KM (Chebyshev) UCL	432.8
SD	253.2	97.5% KM (Chebyshev) UCL	543.1
k star	0.357	99% KM (Chebyshev) UCL	760
Theta star	571.7		
Nu star	17.84	Potential UCLs to Use	
AppChi2	9.276	95% KM (t) UCL	277.8
95% Gamma Approximate UCL (Use when n >= 40)	392.4		
95% Adjusted Gamma UCL (Use when n < 40)	411		
Note: DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL.	
-		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insigh	t, the user m	ay want to consult a statistician.	

	General S	Statistics	
Number of Valid Data	25	Number of Detected Data	1
Number of Distinct Detected Data	11	Number of Non-Detect Data	1-
Number of Missing Values	19	Percent Non-Detects	56.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	42	Minimum Detected	3.73
Maximum Detected	690	Maximum Detected	6.53
Mean of Detected	170.7	Mean of Detected	4.69
SD of Detected	198.9	SD of Detected	0.9
Minimum Non-Detect	340	Minimum Non-Detect	5.82
Maximum Non-Detect	4000	Maximum Non-Detect	8.29
Note: Data have multiple DLs - Use of KM Method is recommen	nded	Number treated as Non-Detect	2
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.009
	UCL Sta	atistics	
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values On	
Shapiro Wilk Test Statistic	0.69	Shapiro Wilk Test Statistic	0.88
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.8
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	257.1	Mean	5.11
SD	385.7	SD	0.83
95% DL/2 (t) UCL	389.1	95% H-Stat (DL/2) UCL	349.
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly	IN/A	Mean in Log Scale	4.57
WILE Method falled to converge property		SD in Log Scale	0.648
		Mean in Original Scale	126.
		SD in Original Scale	136.3
		95% t UCL	173.3
		95% Percentile Bootstrap UCL	175.5
		95% BCA Bootstrap UCL	192.4
		95% H-UCL	157.3
Gamma Distribution Test with Detected Values Onl	v	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.987	Data Follow Appr. Gamma Distribution at 5% Significance	Level
Theta Star	172.9		
nu star	21.72		
	2 22 4		
A-D Test Statistic	0.824 0.746	Nonparametric Statistics	
5% A-D Critical Value K-S Test Statistic	0.746	Kaplan-Meier (KM) Method	133.
5% K-S Critical Value	0.740	Mean SD	144.
Data follow Appr. Gamma Distribution at 5% Significance		SE of Mean	35.4
Bata tollow / ppr. danima Biotribution at 6% Orginicanoc	LOVOI	95% KM (t) UCL	194.4
Assuming Gamma Distribution		95% KM (z) UCL	19:
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	194.
Minimum	4.315	95% KM (bootstrap t) UCL	244.
Maximum	690	95% KM (BCA) UCL	194.
Mean	149.5	95% KM (Percentile Bootstrap) UCL	194.
Median	120.9	95% KM (Chebyshev) UCL	288.
CD	141.3	97.5% KM (Chebyshev) UCL	355.
SD	1.257	99% KM (Chebyshev) UCL	486.
k star			
k star Theta star	118.9		
k star Theta star Nu star	118.9 62.84	Potential UCLs to Use	
k star Theta star Nu star AppChi2	118.9 62.84 45.6	Potential UCLs to Use 95% KM (t) UCL	194
k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40)	118.9 62.84 45.6 206		194.
k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	118.9 62.84 45.6		194.
k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40)	118.9 62.84 45.6 206		194.
k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40) lote: DL/2 is not a recommended method.  Note: Suggestions regarding the selection of a 95%	118.9 62.84 45.6 206 210.6		

	General S		
Number of Valid Data	25	Number of Detected Data	
Number of Distinct Detected Data	11	Number of Non-Detect Data	
Number of Missing Values	19	Percent Non-Detects	56.00
Raw Statistics		Log-transformed Statistics	
Minimum Detected	63	Minimum Detected	4.14
Maximum Detected	910	Maximum Detected	6.8
Mean of Detected	227.7	Mean of Detected	5.02
SD of Detected	257.8	SD of Detected	0.80
Minimum Non-Detect	340	Minimum Non-Detect	5.8
Maximum Non-Detect	4000	Maximum Non-Detect	8.2
ote: Data have multiple DLs - Use of KM Method is recommen	ided	Number treated as Non-Detect	
or all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	
bservations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00
	UCL Sta	tistics	
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Onl	
Shapiro Wilk Test Statistic	0.684	Shapiro Wilk Test Statistic	0.88
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.8
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	282.2	Mean	5.25
SD	395.4	SD	0.75
95% DL/2 (t) UCL	417.5	95% H-Stat (DL/2) UCL	359
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	4.88
		SD in Log Scale	0.61
		Mean in Original Scale	169
		SD in Original Scale	176
		95% t UCL	229
		95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	231 254
		95% BCA BOOISITAD OCE 95% H-UCL	207
		-	207
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.065	Data Follow Appr. Gamma Distribution at 5% Significance	Level
Theta Star	213.8		
nu star	23.44		
A-D Test Statistic	0.798	Nonparametric Statistics	
5% A-D Critical Value	0.744	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.744	Mean	173
5% K-S Critical Value	0.26	SD	182
Data follow Appr. Gamma Distribution at 5% Significance		SE of Mean	43.0
		95% KM (t) UCL	247
Assuming Gamma Distribution		95% KM (z) UCL	244
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	246
Minimum	17.77	95% KM (bootstrap t) UCL	314
Maximum	910	95% KM (BCA) UCL	254
Mean	197.5	95% KM (Percentile Bootstrap) UCL	2
Median	170	95% KM (Chebyshev) UCL	361
SD	181.9	97.5% KM (Chebyshev) UCL	442
k star	1.475	99% KM (Chebyshev) UCL	601
Theta star	133.9	2	
Nu star	73.76	Potential UCLs to Use	2
	54.98	95% KM (t) UCL	247
AppChi2	2012		
AppChi2 95% Gamma Approximate UCL (Use when n >= 40)	264.9		
AppChi2 95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	264.9 270.3		
AppChi2 95% Gamma Approximate UCL (Use when n >= 40)			
AppChi2 95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40) ote: DL/2 is not a recommended method.  Note: Suggestions regarding the selection of a 95%	270.3 UCL are prov	rided to help the user to select the most appropriate 95% UCL.	

	General S	Statistics	
Number of Valid Data	25	Number of Detected Data	12
Number of Distinct Detected Data	12	Number of Non-Detect Data	1:
Number of Missing Values	19	Percent Non-Detects	52.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	51	Minimum Detected	3.93
Maximum Detected	1300	Maximum Detected	7.1
Mean of Detected	247.5	Mean of Detected	4.96
SD of Detected	354.6	SD of Detected	0.96
Minimum Non-Detect	340	Minimum Non-Detect	5.82
Maximum Non-Detect	4000	Maximum Non-Detect	8.29
ا Note: Data have multiple DLs - Use of KM Method is recommen	nded	Number treated as Non-Detect	2
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.009
	UCL Sta	atistics	
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values On	ıly
Shapiro Wilk Test Statistic	0.588	Shapiro Wilk Test Statistic	0.87
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	296.2	Mean	5.23
SD	429.6	SD	0.84
95% DL/2 (t) UCL	443.2	95% H-Stat (DL/2) UCL	396.
Maximum Likalihaad Fatimata/MLF\ Mathad	N/A	Log DOS Mathad	
Maximum Likelihood Estimate(MLE) Method  MLE method failed to converge properly	IN/A	Log ROS Method Mean in Log Scale	4.82
MLE method falled to converge property		SD in Log Scale	0.70
		Mean in Original Scale	178.
		SD in Original Scale	250.
		95% t UCL	264.
		95% Percentile Bootstrap UCL	272.
		95% BCA Bootstrap UCL	337.
		95% H-UCL	217.
Gamma Distribution Test with Detected Values Only	,	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.844	Data appear Lognormal at 5% Significance Level	
Theta Star	293.3	11 0	
nu star	20.25		
A.D. Tarak Observation	1 000	Name and a Chatlanta	
A-D Test Statistic 5% A-D Critical Value	1.083 0.756	Nonparametric Statistics  Kaplan-Meier (KM) Method	
K-S Test Statistic	0.756	Mean	184.
5% K-S Critical Value	0.750	SD	255.
Data not Gamma Distributed at 5% Significance Leve		SE of Mean	57.3
Data not danima biodibatoa at 070 digimioanto 201	·	95% KM (t) UCL	282.
Assuming Gamma Distribution		95% KM (z) UCL	278.
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	281.
Minimum	0.000001	95% KM (bootstrap t) UCL	432.
	1300	95% KM (BCA) UCL	291.
Maximum		95% KM (Percentile Bootstrap) UCL	283.
	207		434.
Maximum Mean Median	160.9	95% KM (Chebyshev) UCL	
Maximum Mean Median SD	160.9 254	97.5% KM (Chebyshev) UCL	542.
Maximum Mean Median SD k star	160.9 254 0.533		542
Maximum Mean Median SD k star Theta star	160.9 254 0.533 388.4	97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL	542.
Maximum Mean Median SD k star Theta star Nu star	160.9 254 0.533 388.4 26.64	97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use	542 754
Maximum Mean Median SD k star Theta star Nu star AppChi2	160.9 254 0.533 388.4 26.64 15.88	97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use 95% KM (t) UCL	542 754 282
Maximum Mean Median SD k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40)	160.9 254 0.533 388.4 26.64 15.88 347.4	97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use	542. 754. 282. 283.
Maximum  Mean  Median  SD  k star  Theta star  Nu star  AppChi2  95% Gamma Approximate UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	160.9 254 0.533 388.4 26.64 15.88	97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use 95% KM (t) UCL	542. 754. 282.
Maximum Mean Median SD k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40) Note: DL/2 is not a recommended method.	160.9 254 0.533 388.4 26.64 15.88 347.4 360.2	97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL  Potential UCLs to Use 95% KM (t) UCL 95% KM (% Bootstrap) UCL	542 754 282 283
Maximum  Mean  Median  SD  k star  Theta star  Nu star  AppChi2  95% Gamma Approximate UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Note: DL/2 is not a recommended method.	160.9 254 0.533 388.4 26.64 15.88 347.4 360.2	97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use 95% KM (t) UCL	542 754 282 283

General S	Statistics	
19	Number of Detected Data	1
1	Number of Non-Detect Data	18
25	Percent Non-Detects	94.74%
d! ProUCL (d	or any other software) should not be used on such a data set!	
		, BTV).
IBENZO(A,F	H)ANTHRACENE was not processed!	
		4
22	Percent Non-Detects	18 81.82%
00		4.40
		4.127
		5.481
		4.685
		0.647
		5.829 8.294
4000	Maximum Non-Detect	0.23
ded	Number treated as Non-Detect	22
		100.000
	Single DL Non-Detect Percentage	100.00%
may not be	reliable enough to draw conclusions	
ore distinct o	observations for accurate and meaningful results.	
UCL Sta	atistics	
	Lognormal Distribution Test with Detected Values On	lv
	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic	
0.869 0.748	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.889
0.869	Shapiro Wilk Test Statistic	0.889 0.748
0.869	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	0.889
0.869	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.889
0.869 0.748	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	0.889 0.748
0.869 0.748 269.9	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.889 0.748 5.292
0.869 0.748	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	0.889 0.748 5.292 0.629
0.869 0.748 269.9 389.5 412.8	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean SD 95% H-Stat (DL/2) UCL	0.889 0.748 5.292 0.629
0.869 0.748 269.9 389.5	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method	0.889 0.748 5.292 0.629 324.4
0.869 0.748 269.9 389.5 412.8	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale	0.889 0.748 5.292 0.629 324.4
0.869 0.748 269.9 389.5 412.8	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	0.889 0.748 5.292 0.629 324.4 4.685 0.41°
0.869 0.748 269.9 389.5 412.8	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	0.889 0.748 5.292 0.629 324.4 4.689 0.411
0.869 0.748 269.9 389.5 412.8	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Coriginal Scale SD in Original Scale	0.889 0.748 5.292 0.629 324.4 4.689 0.411 117.5
0.869 0.748 269.9 389.5 412.8	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Coriginal Scale SD in Original Scale 95% t UCL	5.292 0.629 324.4 4.689 0.411 117.5 135.8
0.869 0.748 269.9 389.5 412.8	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Coriginal Scale SD in Original Scale	0.889 0.748 5.292 0.629
	General S  22  4 22  4 22  62 240 127 83.43 340 4000 aded	1 Number of Non-Detect Data 25 Percent Non-Detects  Id! ProUCL (or any other software) should not be used on such a data set! Inined by the Project Team to estimate environmental parameters (e.g., EPC  IDBENZO(A,H)ANTHRACENE was not processed!  General Statistics  22 Number of Detected Data 4 Number of Non-Detect Data 22 Percent Non-Detect Data 22 Percent Non-Detects  Log-transformed Statistics 62 Minimum Detected 240 Maximum Detected 127 Mean of Detected 127 Mean of Detected 83.43 SD of Detected 340 Minimum Non-Detect 4000 Maximum Non-Detect

INDENO(1,2,3-CD)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.99	Data appear Normal at 5% Significance Level	
Theta Star	128.3		
nu star	7.921		
A-D Test Statistic	0.39	Nonparametric Statistics	
5% A-D Critical Value	0.659	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.659	Mean	12
5% K-S Critical Value	0.396	SD	72.2
Data appear Gamma Distributed at 5% Significance Le	vel	SE of Mean	41.7
		95% KM (t) UCL	198.
Assuming Gamma Distribution		95% KM (z) UCL	195.0
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	208
Minimum	50.95	95% KM (bootstrap t) UCL	259.
Maximum	240	95% KM (BCA) UCL	206.7
Mean	126.8	95% KM (Percentile Bootstrap) UCL	205.2
Median	126.5	95% KM (Chebyshev) UCL	308.
SD	53.83	97.5% KM (Chebyshev) UCL	387.
k star	4.594	99% KM (Chebyshev) UCL	542.
Theta star	27.6		
Nu star	202.1	Potential UCLs to Use	
AppChi2	170.3	95% KM (t) UCL	198.
95% Gamma Approximate UCL (Use when n >= 40)	150.5	95% KM (Percentile Bootstrap) UCL	205.2
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
lote: DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight	, the user m	ay want to consult a statistician.	

	General Statis	tics	
Number of Valid Data	44	Number of Detected Data	
Number of Distinct Detected Data	35	Number of Non-Detect Data	
		Percent Non-Detects	2.27
Raw Statistics		Log-transformed Statistics	
Minimum Detected	3.9	Minimum Detected	1.3
Maximum Detected	37.3	Maximum Detected	3.6
Mean of Detected	16.72	Mean of Detected	2.7
SD of Detected	7.419	SD of Detected	0.5
Minimum Non-Detect	4.1	Minimum Non-Detect	1.4
Maximum Non-Detect	4.1	Maximum Non-Detect	1.4
	UCL Statistic	es estate estate estate estate estate estate estate estate estate estate estate estate estate estate estate es	
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.944	Shapiro Wilk Test Statistic	0.9
5% Shapiro Wilk Critical Value	0.943	5% Shapiro Wilk Critical Value	0.9
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	16.39	Mean	2.
SD	7.658	SD	0.
95% DL/2 (t) UCL	18.33	95% H-Stat (DL/2) UCL	20
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	16.29	Mean in Log Scale	2.
SD	7.784	SD in Log Scale	(
95% MLE (t) UCL	18.26	Mean in Original Scale	16
95% MLE (Tiku) UCL	18.25	SD in Original Scale	7.
		95% t UCL	18
		95% Percentile Bootstrap UCL	18
		95% BCA Bootstrap UCL	18
		95% H UCL	19
Gamma Distribution Test with Detected Values Onl	v	Data Distribution Test with Detected Values Only	
k star (bias corrected)	4.24	Data appear Normal at 5% Significance Level	
Theta Star	3.944		
nu star	364.6		
A.D. Toot Statistic	0.972	Nonparametric Statistics	
A-D Test Statistic 5% A-D Critical Value	0.972	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.753	Mean	10
5% K-S Critical Value	0.135	SD	7.
Data not Gamma Distributed at 5% Significance Lev		SE of Mean	1.
Data flot daffilla Distributed at 070 Oignificance Ecv	OI .	95% KM (t) UCL	18
Assuming Gamma Distribution		95% KM (z) UCL	1
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1
Minimum	0.000001	95% KM (bootstrap t) UCL	1
Maximum	37.3	95% KM (BCA) UCL	18
Mean	16.34	95% KM (Percentile Bootstrap) UCL	1
Median	16.55	95% KM (Chebyshev) UCL	2
SD	7.753	97.5% KM (Chebyshev) UCL	2
k star	1.144	99% KM (Chebyshev) UCL	2
Theta star	14.29		
Nu star	100.7	Potential UCLs to Use	
	78.51	95% KM (t) UCL	1
AppChi2	20.95	95% KM (Percentile Bootstrap) UCL	1
95% Gamma Approximate UCL (Use when n >= 40)			_
95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	21.13		
95% Gamma Approximate UCL (Use when n >= 40)			
95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40) DL/2 is not a recommended method.	21.13	i to help the user to select the most appropriate 95% UCL.	

			_	
User Selected Options	General UCL Statistics f	or Full Data	Sets	
	C:\Work Folders\Projects	s\Newnort\D4	erecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - Ce	entral Shi
	OFF	3 II VCW POIT IDC	CICCRONDITATE I III A FISC ASSESSMENTALE CONDUCTACE COIL - CC	onitial Oni
	95%			
	2000			
Number of Bootstrap Operations	2000			
LUMINUM				
		General	Statistics	
Numb	per of Valid Observations		Number of Distinct Observations	25
	umber of Missing Values		Trumber of Distinct Observations	20
INC	aniber of Missing Values	17		
Raw St	atistics		Log-transformed Statistics	
	Minimum	4820	Minimum of Log Data	8.481
	Maximum		Maximum of Log Data	
	Mean		Mean of log Data	
	Geometric Mean		SD of log Data	0.266
	Median	9950		
		2335		
	Std. Error of Mean			
	Coefficient of Variation			
	Skewness	-0.102		
		Relevant U	CL Statistics	
Normal Distr	ibution Test	. tolovalit Ot	Lognormal Distribution Test	
	hapiro Wilk Test Statistic	0.974	Shapiro Wilk Test Statistic	0.949
	napiro Wilk Critical Value		Shapiro Wilk Critical Value	
Data appear Normal at		10.000	Data appear Lognormal at 5% Significance Level	
Assuming Norn	nal Distribution		Assuming Lognormal Distribution	
•	95% Student's-t UCL	10214	95% H-UCL	10410
95% UCLs (Adjus	sted for Skewness)		95% Chebyshev (MVUE) UCL	11603
95% Adjusted	d-CLT UCL (Chen-1995)	10177	97.5% Chebyshev (MVUE) UCL	12528
95% Modifie	ed-t UCL (Johnson-1978)	10213	99% Chebyshev (MVUE) UCL	14346
O Di			Data Distribution	
Gamma Distr		12.00	Data Distribution	
	k star (bias corrected) Theta Star		Data appear Normal at 5% Significance Level	
	MLE of Mean			
MI	E of Standard Deviation			
IVIL	nu star			
Approximate	e Chi Square Value (.05)		Nonparametric Statistics	
	ted Level of Significance		95% CLT UCL	10187
	justed Chi Square Value		95% Jackknife UCL	
710	jassa o oqualo valuo		95% Standard Bootstrap UCL	
Anders	son-Darling Test Statistic	0.53	95% Bootstrap-t UCL	
	Darling 5% Critical Value		95% Hall's Bootstrap UCL	
	ov-Smirnov Test Statistic		95% Percentile Bootstrap UCL	
	mirnov 5% Critical Value		95% BCA Bootstrap UCL	
Data appear Gamma Distribu			95% Chebyshev(Mean, Sd) UCL	
			97.5% Chebyshev(Mean, Sd) UCL	
Assuming Gam			99% Chebyshev(Mean, Sd) UCL	
95% Approximate Gamma l				
95% Adjusted Gamma	UCL (Use when n < 40)	10362		
Potential U	ICI to like		Use 95% Student's-t UCL	10214
Fotential O	OL 10 036		USE 35 % Student S-t UCL	10214
Note: Suggestions regardir	ng the selection of a 95%	UCL are pro	ovided to help the user to select the most appropriate 95% UCL	
These recommendations	s are based upon the res	ults of the si	mulation studies summarized in Singh, Singh, and laci (2002)	
and Singh	and Singh (2003). For	additional ins	sight, the user may want to consult a statistician.	
	Note: For highly	negative-sk	ewed data, confidence limits	
	(e.g., Chen, Johr	son, Lognor	mal, and Gamma) may not be	
			nnson's methods provide	
	adjustme	nts for posity	vely skewed data sets.	

	Genera	I Statistics
Number of Valid Observations	44	Number of Distinct Observations 30
Raw Statistics		Log-transformed Statistics
Minimum	6.3	Minimum of Log Data 1.841
Maximum		Maximum of Log Data 3.091
Mean	12.48	Mean of log Data 2.49
Geometric Mean	12.07	SD of log Data 0.268
Median	13	
SD	3.225	
Std. Error of Mean	0.486	
Coefficient of Variation	0.258	
Skewness	0.439	
	Relevant U	JCL Statistics
Normal Distribution Test		Lognormal Distribution Test
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic 0.966
Shapiro Wilk Critical Value	0.944	Shapiro Wilk Critical Value 0.944
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	13.3	95% H-UCL 13.43
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 14.73
95% Adjusted-CLT UCL (Chen-1995)	13.32	97.5% Chebyshev (MVUE) UCL 15.69
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL 17.59
Gamma Distribution Test		Data Distribution
k star (bias corrected)	13 96	Data appear Normal at 5% Significance Level
Theta Star		Data appear Herman at 070 eignmeaned zeron
MLE of Mean		
MLE of Standard Deviation	_	
nu star		
Approximate Chi Square Value (.05)	1148	Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 13.28
Adjusted Chi Square Value	1146	95% Jackknife UCL 13.3
		95% Standard Bootstrap UCL 13.26
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 13.33
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 13.34
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 13.24
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 13.31
Data appear Gamma Distributed at 5% Significance L	.evel	95% Chebyshev(Mean, Sd) UCL 14.6
	<u> </u>	97.5% Chebyshev(Mean, Sd) UCL 15.52
Assuming Gamma Distribution	T	99% Chebyshev(Mean, Sd) UCL 17.32
95% Approximate Gamma UCL (Use when n >= 40)		
95% Adjusted Gamma UCL (Use when n < 40)	13.39	
Potential UCL to Use		Use 95% Student's-t UCL 13.3
Note: Compations aggregation the coloration of CCC	/ LICI	unided to help the year to color the work of the CFO/ LICI
		rovided to help the user to select the most appropriate 95% UCL. simulation studies summarized in Singh, Singh, and laci (2002)
mese recommendadons are based upon the res		nsight, the user may want to consult a statistician.

	General Sta	atistics
Number of Valid Observations	27	Number of Distinct Observations 24
Number of Missing Values	17	
Daw Oladada	1	Landana de marco de Oranio de Carto
Raw Statistics	2.0	Log-transformed Statistics
Minimum Maximum		Minimum of Log Data 1.36 Maximum of Log Data 3.006
Mean		Mean of log Data 2.34
Geometric Mean		SD of log Data 0.373
Median		OD of log Data 0.370
	3.732	
Std. Error of Mean		
Coefficient of Variation		
Skewness	0.403	
	Relevant UCL	Statistics
Normal Distribution Test	Troicvant GGE	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.968	Shapiro Wilk Test Statistic 0.94
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value 0.923
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution	1.0.00	Assuming Lognormal Distribution
95% Student's-t UCL	12.27	95% H-UCL 12.78
95% UCLs (Adjusted for Skewness)	10.00	95% Chebyshev (MVUE) UCL 14.68
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)	12.29	97.5% Chebyshev (MVUE) UCL 16.22 99% Chebyshev (MVUE) UCL 19.25
95 % Woullied-t OCL (Joillison-1978)	12.20	99% Chebyshev (MIVOE) OCL 19.23
Gamma Distribution Test		Data Distribution
k star (bias corrected)	7.428	Data appear Normal at 5% Significance Level
Theta Star	1.487	
MLE of Mean	11.05	
MLE of Standard Deviation	4.054	
nu star		
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 12.23
Adjusted Chi Square Value	353	95% Jackknife UCL 12.27
A L D II T 10 11 11	0.145	95% Standard Bootstrap UCL 12.2
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 12.42
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 12.4
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value		95% Percentile Bootstrap UCL 12.24 95% BCA Bootstrap UCL 12.2
Data appear Gamma Distributed at 5% Significance L	.evei	95% Chebyshev(Mean, Sd) UCL 14.18 97.5% Chebyshev(Mean, Sd) UCL 15.53
Assuming Gamma Distribution	1	99% Chebyshev(Mean, Sd) UCL 18.19
95% Approximate Gamma UCL (Use when n >= 40)	12 46	33 % Onebyshev(Mean, Ou) OCL 10.13
95% Adjusted Gamma UCL (Use when n < 40)		
Potontic LIOL to Lice		Una 050/ Ohi, danala a UO 140 05
Potential UCL to Use		Use 95% Student's-t UCL 12.27
Note: Suggestions regarding the selection of a 95%	UCL are provi	ded to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the res	sults of the simu	lation studies summarized in Singh, Singh, and laci (2002)
		ht, the user may want to consult a statistician.

	General S	statistics
Number of Valid Observations		Number of Distinct Observations 25
Number of Missing Values		
Raw Statistics		Log-transformed Statistics
Minimum		Minimum of Log Data 9.568
Maximum		Maximum of Log Data 10.6
Mean		Mean of log Data 10.07
Geometric Mean		SD of log Data 0.292
Median	6914	
Std. Error of Mean		
Coefficient of Variation		
Skewness		
	1	
Normal Distribution Test	Relevant UC	L Statistics  Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.952	Shapiro Wilk Test Statistic 0.938
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value 0.923
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	26897	95% H-UCL 27409
95% UCLs (Adjusted for Skewness)	20037	95% Chebyshev (MVUE) UCL 30798
95% Adjusted-CLT UCL (Chen-1995)	26883	97.5% Chebyshev (MVUE) UCL 33454
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL 38671
Gamma Distribution Test		Data Distribution
k star (bias corrected)	11.34	Data appear Normal at 5% Significance Level
Theta Star		
MLE of Mean	24628	
MLE of Standard Deviation	7314	
nu star		
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 26816
Adjusted Chi Square Value	552.4	95% Jackknife UCL 26897
		95% Standard Bootstrap UCL 26724
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 27018
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 26990
Kolmogorov-Smirnov Test Statistic	0.1/3	95% Percentile Bootstrap UCL 26767
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 26787
Data follow Appr. Gamma Distribution at 5% Significance	Level	95% Chebyshev(Mean, Sd) UCL 30428 97.5% Chebyshev(Mean, Sd) UCL 32938
Assuming Gamma Distribution		97.5% Chebyshev(Mean, Sd) UCL 32938
95% Approximate Gamma UCL (Use when n >= 40)	27127	33 % Chebyshev(weah, 3d) UCL 37807
95% Adjusted Gamma UCL (Use when n < 40)		
Potential UCL to Use		Use 95% Student's-t UCL 26897
	UCL are pro-	vided to help the user to select the most appropriate 95% UCL.
Note: Suggestions regarding the selection of a 95%	COL GIO PIO	nulation studies summarized in Singh, Singh, and laci (2002)

		Statistics
Number of Valid Observations		Number of Distinct Observations 27
Number of Missing Values	1/	
Raw Statistics		Log-transformed Statistics
Minimum	86.2	Minimum of Log Data 4.457
Maximum		Maximum of Log Data 6.417
Mean	336.2	Mean of log Data 5.71
Geometric Mean	302	SD of log Data 0.513
Median		
	140.3	
Std. Error of Mean		
Coefficient of Variation		
Skewness	0.0635	
	Relevant U	ICL Statistics
Normal Distribution Test		Lognormal Distribution Test
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic 0.894
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value 0.923
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	382.3	95% H-UCL 420.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 496.4
95% Adjusted-CLT UCL (Chen-1995)	381	97.5% Chebyshev (MVUE) UCL 563
95% Modified-t UCL (Johnson-1978)	382.3	99% Chebyshev (MVUE) UCL 693.8
Gamma Distribution Test		Data Distribution
k star (bias corrected)	1 21	Data appear Normal at 5% Significance Level
Theta Star		Data appear Normal at 5 % Significance Level
MLE of Mean		
MLE of Standard Deviation		
nu star		
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 380.6
Adjusted Chi Square Value		95% Jackknife UCL 382.3
,		95% Standard Bootstrap UCL 379.7
Anderson-Darling Test Statistic	0.741	95% Bootstrap-t UCL 386.4
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 383.3
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 380.6
Kolmogorov-Smirnov 5% Critical Value	0.169	95% BCA Bootstrap UCL 381
Data follow Appr. Gamma Distribution at 5% Significance	Level	95% Chebyshev(Mean, Sd) UCL 453.9
		97.5% Chebyshev(Mean, Sd) UCL 504.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 604.9
95% Approximate Gamma UCL (Use when n >= 40)		
95% Adjusted Gamma UCL (Use when n < 40)	398.4	
Potential UCL to Use		Use 95% Student's-t UCL 382.3
Note: Suggestions regarding the selection of a 95%	UCL are p	rovided to help the user to select the most appropriate 95% UCL.
i nese recommendations are based upon the resi	uits of the s	imulation studies summarized in Singh, Singh, and laci (2002)

Former Building 234

**Unpaved Surface Soil** 

	Concret LICI Statistics fo	n Doto Coto	with New Detects	
User Selected Options	General UCL Statistics fo	r Data Sets v	WITH NON-Detects	
From File		Nowport\Dor	recktor\Draft Final Risk Assessment\EPCs\Unpaved Surface Soil	L Duilding
Figure From File Full Precision	OFF	inewport/Dei	eckloribrait Final Kisk Assessment(EFCstonpaved Surface Soil	i - bullullig
Confidence Coefficient	95%			
	2000			
Number of Bootstrap Operations	]2000			
BENZO(A)ANTHRACENE				
		General S	Statistics	
	Number of Valid Data	7	Number of Detected Data	6
Number	of Distinct Detected Data	6	Number of Non-Detect Data	1
			Percent Non-Detects	14.29%
Raw S	Statistics		Log-transformed Statistics	
	Minimum Detected	60	Minimum Detected	4.094
	Maximum Detected	470	Maximum Detected	6.153
	Mean of Detected	210	Mean of Detected	5.151
	SD of Detected	143.8	SD of Detected	0.705
	Minimum Non-Detect	710	Minimum Non-Detect	6.565
	Maximum Non-Detect	710	Maximum Non-Detect	6.565
Note:	It should be noted that ev	en though bo	petected Values in this data potstrap may be performed on this data set reliable enough to draw conclusions	
	It should be noted that even the resulting calculations	ren though bo may not be i		
	It should be noted that even the resulting calculations	ren though bo may not be i	ootstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.	
It is recomn	It should be noted that even the resulting calculations	may not be in more distinct of UCL Sta	ootstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.	,
It is recomn  Normal Distribution Test	It should be noted that even the resulting calculations nended to have 10-15 or m	may not be in more distinct of UCL Sta	potstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.	
It is recomn  Normal Distribution Test	It should be noted that even the resulting calculations nended to have 10-15 or more with Detected Values Only	may not be in ma	potstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results. atistics Lognormal Distribution Test with Detected Values Only	0.991
It is recomn  Normal Distribution Test  5% S	It should be noted that ever the resulting calculations nended to have 10-15 or moved the resulting calculations nended to have 10-15 or moved the resulting calculations.	under though be may not be in though be in the may not be in the m	potstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results. attistics Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	0.991
Normal Distribution Test  5% S  Data appear Normal a	It should be noted that even the resulting calculations mended to have 10-15 or mended to have 10-15 o	under though be may not be in though be in the may not be in the m	cotstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	0.991
Normal Distribution Test  5% S  Data appear Normal a  Assuming Nor	It should be noted that ever the resulting calculations needed to have 10-15 or moved the resulting calculations needed to have 10-15 or moved to have 10-15 or	under though be may not be in though be in the may not be in the m	cotstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.991
Normal Distribution Test  5% S  Data appear Normal a  Assuming Normal	It should be noted that even the resulting calculations mended to have 10-15 or mended to have 10-15 o	under though be may not be in though be in the may not be in the m	cotstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.991 0.788
Normal Distribution Test  5% S  Data appear Normal a  Assuming Normal	It should be noted that ever the resulting calculations mended to have 10-15 or moved the property of the prop	uch though be may not be in though be may not be in the formation of the following states of the follo	cotstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method	0.991 0.788 5.254
It is recomn  Normal Distribution Test  5% S  Data appear Normal a  Assuming Nor	the resulting calculations  mended to have 10-15 or m  with Detected Values Only Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level  mal Distribution  DL/2 Substitution Method  Mean	uch though be may not be in ma	cotstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.991 0.788 5.254 0.699
Normal Distribution Test  5% S  Data appear Normal a  Assuming Nor	the resulting calculations  nended to have 10-15 or m  with Detected Values Only Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level  mal Distribution  DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL	uch though be may not be in though be may not be in the formation of the following states of the follo	cotstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.991 0.788 5.254 0.699
Normal Distribution Test  5% S  Data appear Normal a  Assuming Nor  Maximum Likelihoo	the resulting calculations  nended to have 10-15 or m  with Detected Values Only Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level  mal Distribution  DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  and Estimate(MLE) Method	uch though be may not be in though be may not be in the formation of the following states of the follo	cotstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.991 0.788 5.254 0.699 558.3
Normal Distribution Test  5% S  Data appear Normal a  Assuming Nor  Maximum Likelihoo	the resulting calculations  nended to have 10-15 or m  with Detected Values Only Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level  mal Distribution  DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL	uch though be may not be in though be may not be in the formation of the following states of the follo	cotstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	0.991 0.788 5.254 0.699 558.3
Normal Distribution Test  5% S  Data appear Normal a  Assuming Nor  Maximum Likelihoo	the resulting calculations  nended to have 10-15 or m  with Detected Values Only Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level  mal Distribution  DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  and Estimate(MLE) Method	uch though be may not be in though be may not be in the formation of the following states of the follo	cotstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	0.991 0.788 5.254 0.699 558.3 5.151 0.643
Normal Distribution Test  5% S  Data appear Normal a  Assuming Nor  Maximum Likelihoo	the resulting calculations  nended to have 10-15 or m  with Detected Values Only Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level  mal Distribution  DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  and Estimate(MLE) Method	uch though be may not be in though be may not be in the formation of the following states of the follo	cotstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	5.254 0.699 558.3 5.151 0.643 204.6
Normal Distribution Test  5% S  Data appear Normal a  Assuming Nor  Maximum Likelihoo	the resulting calculations  nended to have 10-15 or m  with Detected Values Only Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level  mal Distribution  DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  and Estimate(MLE) Method	uch though be may not be in though be may not be in the formation of the following states of the follo	Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  SD on Subscience Subscience  Reliable enough to draw conclusions  Mean to draw conclusions  Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Original Scale  SD in Original Scale	5.254 0.699 558.3 5.151 0.643 204.6
Normal Distribution Test  5% S  Data appear Normal a  Assuming Nor  Maximum Likelihoo	the resulting calculations  nended to have 10-15 or m  with Detected Values Only Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level  mal Distribution  DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  and Estimate(MLE) Method	uch though be may not be in though be may not be in the formation of the following states of the follo	Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  SD versions  SD  SD  SD  SD  SD  SD  SD  SD  SD  S	5.254 0.699 558.3 5.151 0.643 204.6 132 301.6
Normal Distribution Test  5% S  Data appear Normal a  Assuming Nor  Maximum Likelihoo	the resulting calculations  nended to have 10-15 or m  with Detected Values Only Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level  mal Distribution  DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  and Estimate(MLE) Method	uch though be may not be in though be may not be in the formation of the following states of the follo	Assuming Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  95% t UCL  95% Percentile Bootstrap UCL	5.254 0.699 558.3 5.151 0.643 204.6 132 301.6 284.3
Normal Distribution Test  5% S  Data appear Normal a  Assuming Nor  Maximum Likelihoo	the resulting calculations  nended to have 10-15 or m  with Detected Values Only Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level  mal Distribution  DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  and Estimate(MLE) Method	uch though be may not be in though be may not be in the formation of the following states of the follo	Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  SD versions  SD  SD  SD  SD  SD  SD  SD  SD  SD  S	

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
		Data appear Normal at 5% Significance Level	
k star (bias corrected) Theta Star	1.46 143.8	Data appear Normal at 5% Significance Level	
	17.52		
nu star	17.32		
A-D Test Statistic	0.177	Nonparametric Statistics	
5% A-D Critical Value	0.702	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.702	Mean	2
5% K-S Critical Value	0.335	SD	13
Data appear Gamma Distributed at 5% Significance Lev	rel	SE of Mean	58
		95% KM (t) UCL	32
Assuming Gamma Distribution		95% KM (z) UCL	30
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	32
Minimum	60	95% KM (bootstrap t) UCL	40
Maximum	470	95% KM (BCA) UCL	30
Mean	210.9	95% KM (Percentile Bootstrap) UCL	3
Median	200	95% KM (Chebyshev) UCL	46
SD	131.3	97.5% KM (Chebyshev) UCL	57
k star	1.88	99% KM (Chebyshev) UCL	79
Theta star	112.2		
Nu star	26.32	Potential UCLs to Use	
AppChi2	15.62	95% KM (t) UCL	32
95% Gamma Approximate UCL (Use when n >= 40)	355.2	95% KM (Percentile Bootstrap) UCL	3
95% Adjusted Gamma UCL (Use when n < 40)	420.4		
DL/2 is not a recommended method.	•		
Note: Suggestions regarding the selection of a 95% U	JCL are provi	ded to help the user to select the most appropriate 95% UCL.	
		ntion studies summarized in Singh, Maichle, and Lee (2006).	
		want to consult a statistician.	

	General St	ratistics	
Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
		Percent Non-Detects	14.29%
David Obalitation		Law towards may a Challada.	
Raw Statistics	50	Log-transformed Statistics	2.010
Minimum Detected	50	Minimum Detected	3.912
Maximum Detected	410	Maximum Detected	6.016
Mean of Detected	190	Mean of Detected	5.052
SD of Detected	124.1	SD of Detected	0.719
Minimum Non-Detect	710	Minimum Non-Detect	6.565
Maximum Non-Detect	710	Maximum Non-Detect	6.565
L		L.	
		etected Values in this data	
Note: It should be noted that ev	en though bo	otstrap may be performed on this data set	
the resulting calculations	may not be re	eliable enough to draw conclusions	
-	-		
It is recommended to have 10-15 or m	ore distinct of	oservations for accurate and meaningful results.	
		-	
	UCL Sta		
Normal Distribution Test with Detected Values Only	,	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.912	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	,	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	
Shapiro Wilk Test Statistic	0.912	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level	0.912	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level	0.961
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution	0.912	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.961
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	0.912	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method	0.961 0.788
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	0.912 0.788 213.6	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean	0.961 0.788 5.17
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean SD	0.912 0.788 213.6 129.3	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	0.961 0.788 5.17 0.726
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	0.912 0.788 213.6	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.961 0.788 5.17
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	0.912 0.788 213.6 129.3 308.5	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.961 0.788 5.17 0.726
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.912 0.788 213.6 129.3	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.961 0.788 5.17 0.726 550.9
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	0.912 0.788 213.6 129.3 308.5	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	0.961 0.788 5.17 0.726 550.9
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.912 0.788 213.6 129.3 308.5	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale	5.17 0.726 550.9 5.052 0.656
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.912 0.788 213.6 129.3 308.5	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	5.17 0.726 550.9 5.052 0.656 185.2
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.912 0.788 213.6 129.3 308.5	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	5.17 0.726 550.9 5.052 0.656 185.2
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.912 0.788 213.6 129.3 308.5	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale 95% t UCL	5.17 0.726 550.9 5.052 0.656 185.2 114 268.9
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.912 0.788 213.6 129.3 308.5	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale 95% t UCL 95% Percentile Bootstrap UCL	5.17 0.726 550.9 5.052 0.656 185.2 114 268.9 255.7
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.912 0.788 213.6 129.3 308.5	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale 95% t UCL	5.17 0.726 550.9 5.052 0.656 185.2 114 268.9

BENZO(A)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only	/	Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.473	Data appear Normal at 5% Significance Level	
Theta Star	129	<b></b>	
nu star	17.68		
A-D Test Statistic	0.238	Nonparametric Statistics	
5% A-D Critical Value	0.702	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.702	Mean	19
5% K-S Critical Value	0.335	SD	113.
Data appear Gamma Distributed at 5% Significance Le	evel	SE of Mean	50.60
		95% KM (t) UCL	288.
Assuming Gamma Distribution		95% KM (z) UCL	273.
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	289.
Minimum	50	95% KM (bootstrap t) UCL	319.2
Maximum	410	95% KM (BCA) UCL	267.
Mean	190.8	95% KM (Percentile Bootstrap) UCL	270
Median	195.6	95% KM (Chebyshev) UCL	410.8
SD	113.3	97.5% KM (Chebyshev) UCL	506.4
k star	1.897	99% KM (Chebyshev) UCL	694.
Theta star	100.6		
Nu star	26.56	Potential UCLs to Use	•
AppChi2	15.81	95% KM (t) UCL	288.4
95% Gamma Approximate UCL (Use when n >= 40)	320.5	95% KM (Percentile Bootstrap) UCL	27
95% Adjusted Gamma UCL (Use when n < 40)	378.9		
ote: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95%	UCL are pro	ovided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight	t, the user m	ay want to consult a statistician.	

BENZO(B)FLUORANTHENE			
	General S	Statiation	
Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
Number of Distinct Detected Data	U	Percent Non-Detects	14.29%
		reicent Non-Detects	14.23/0
Raw Statistics		Log-transformed Statistics	
Minimum Detected	66	Minimum Detected	4.19
Maximum Detected	660	Maximum Detected	6.492
Mean of Detected	307.7	Mean of Detected	5.484
SD of Detected	213.6	SD of Detected	0.823
Minimum Non-Detect	710	Minimum Non-Detect	6.565
Maximum Non-Detect	710	Maximum Non-Detect	6.565
		Detected Values in this data	
		ootstrap may be performed on this data set	
the resulting calculations	may not be	reliable enough to draw conclusions	
It is recommended to have 10-15 or m	ore distinct	observations for accurate and meaningful results.	
	1101.0		
Normal Distribution Test with Detected Values Only	UCL St		
Shapiro Wilk Test Statistic	0.957	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic	<b>y</b> 0.973
5% Shapiro Wilk Test Statistic	0.957	5% Shapiro Wilk Critical Value	0.973
	0.788		0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
A councing Name of Distribution		A councing I can caused Distribution	
Assuming Normal Distribution DL/2 Substitution Method		Assuming Lognormal Distribution  DL/2 Substitution Method	
	314.4		5.54
Mean SD	195.8	Mean SD	0.766
95% DL/2 (t) UCL	458.3	95% H-Stat (DL/2) UCL	890.7
95% DL/2 (t) UCL	458.3	95% H-Stat (DL/2) UCL	890.7
Marrian and Librard Cationata (MLC) Mathead	NI/A	Law DOC Mathad	
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	F 404
MLE method failed to converge properly		Mean in Log Scale	5.484
		SD in Log Scale	0.752
		Mean in Original Scale	298.1
		SD in Original Scale	196.6
		95% t UCL	442.6
		95% Percentile Bootstrap UCL	417.1
		95% BCA Bootstrap UCL	433.1
		95% H-UCL	810.1

Gamma Distribution Test with Detected Values Only	,	Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.209	Data appear Normal at 5% Significance Level	
Theta Star	254.4		
nu star	14.51		
A-D Test Statistic	0.154	Nonparametric Statistics	
5% A-D Critical Value	0.704	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.704	Mean	3
5% K-S Critical Value	0.336	SD	
Data appear Gamma Distributed at 5% Significance Le	vel	SE of Mean	8
		95% KM (t) UCL	4
Assuming Gamma Distribution		95% KM (z) UCL	4
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	4
Minimum	66	95% KM (bootstrap t) UCL	5
Maximum	660	95% KM (BCA) UCL	
Mean	308.2	95% KM (Percentile Bootstrap) UCL	4
Median	311.6	95% KM (Chebyshev) UCL	6
SD	195	97.5% KM (Chebyshev) UCL	8
k star	1.546	99% KM (Chebyshev) UCL	-
Theta star	199.3		
Nu star	21.65	Potential UCLs to Use	
AppChi2	12.07	95% KM (t) UCL	4
95% Gamma Approximate UCL (Use when n >= 40)	552.6	95% KM (Percentile Bootstrap) UCL	4
95% Adjusted Gamma UCL (Use when n < 40)	668.1		
DL/2 is not a recommended method.			
		vided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight	, the user m	ay want to consult a statistician.	

	General S	tatistics	
Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
Number of Distinct Detected Data		Percent Non-Detects	14.29%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	46	Minimum Detected	3.829
Maximum Detected	580	Maximum Detected	6.363
Mean of Detected	261	Mean of Detected	5.297
SD of Detected	185.9	SD of Detected	0.882
Minimum Non-Detect	710	Minimum Non-Detect	6.565
Maximum Non-Detect	710	Maximum Non-Detect	6.565
		etected Values in this data	
		potstrap may be performed on this data set	
the resulting calculations	may not be i	eliable enough to draw conclusions	
It is recommended to have 10-15 or m	ore distinct o	bservations for accurate and meaningful results.	
	1101 01	D. D.	
Name of Distribution To at with Data at a d Value of Only	UCL Sta		
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	0.939	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	0.947
5% Shapiro Wilk Critical Value	0.939	5% Shapiro Wilk Critical Value	
Data appear Normal at 5% Significance Level	0.700	Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			0.788
		Data appear Lognormal at 0 % Oignineance Level	0.788
Assuming Normal Distribution			0.788
Assuming Normal Distribution  DL/2 Substitution Method		Assuming Lognormal Distribution	0.788
DL/2 Substitution Method	274.4	Assuming Lognormal Distribution DL/2 Substitution Method	
DL/2 Substitution Method Mean	274.4	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean	5.379
DL/2 Substitution Method  Mean  SD	173.4	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD	5.379 0.834
DL/2 Substitution Method Mean		Assuming Lognormal Distribution  DL/2 Substitution Method  Mean	5.379
DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL	173.4 401.8	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL	5.379 0.834
DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	173.4	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method	5.379 0.834 927.2
DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL	173.4 401.8	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale	5.379 0.834 927.2 5.297
DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	173.4 401.8	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale	5.379 0.834 927.2 5.297 0.806
DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	173.4 401.8	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale	5.379 0.834 927.2 5.297 0.806 252.2
DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	173.4 401.8	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale	5.379 0.834 927.2 5.297 0.806 252.2 171.3
DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	173.4 401.8	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale  95% t UCL	5.379 0.834 927.2 5.297 0.806 252.2 171.3 378
DL/2 Substitution Method  Mean  SD  95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	173.4 401.8	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale	5.379 0.834 927.2 5.297 0.806

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.119	Data appear Normal at 5% Significance Level	
Theta Star	233.2		
nu star	13.43		
A.D. To at Obstication	0.011	Norman annual de Charlatha	
A-D Test Statistic	0.211	Nonparametric Statistics	
5% A-D Critical Value	0.704	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.704	Mean	2
5% K-S Critical Value	0.336	SD	169
Data appear Gamma Distributed at 5% Significance Le	vel	SE of Mean	75.
		95% KM (t) UCL	408
Assuming Gamma Distribution		95% KM (z) UCL	385
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	410
Minimum	46	95% KM (bootstrap t) UCL	452
Maximum	580	95% KM (BCA) UCL	382
Mean	261.1	95% KM (Percentile Bootstrap) UCL	3
Median	261.9	95% KM (Chebyshev) UCL	591
SD	169.7	97.5% KM (Chebyshev) UCL	734
k star	1.427	99% KM (Chebyshev) UCL	10
Theta star	183		
Nu star	19.97	Potential UCLs to Use	
AppChi2	10.83	95% KM (t) UCL	408
95% Gamma Approximate UCL (Use when n >= 40)	481.5	95% KM (Percentile Bootstrap) UCL	3
95% Adjusted Gamma UCL (Use when n < 40)	587.9		
DL/2 is not a recommended method.	•		
Note: Suggestions regarding the selection of a 95%	UCL are pro	vided to help the user to select the most appropriate 95% UCL.	
These recommendations are based upon the result	s of the simu	ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight	t, the user m	ay want to consult a statistician.	

	General Statistics		
Number of Valid Data	6	Number of Detected Data	
Number of Distinct Detected Data	1	Number of Non-Detect Data	
Number of Missing Values	1	Percent Non-Detects	83.339
Warning: Only one distinct data value was detected!  It is suggested to use alternative site specific values determin		/	, BTV).
It is suggested to use alternative site specific values determin	ed by the Project Tea	m to estimate environmental parameters (e.g., EPC,	, BTV).
	ed by the Project Tea	m to estimate environmental parameters (e.g., EPC,	, BTV).
It is suggested to use alternative site specific values determin	ed by the Project Tea	m to estimate environmental parameters (e.g., EPC,	, BTV).

INDENO(1,2,3-CD)PYRENE			
	General Statis	stics	
Number of Valid Data	7	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	3
	-	Percent Non-Detects	42.86%
Raw Statistics		Log transformed Statistics	
Minimum Detected	48	Log-transformed Statistics  Minimum Detected	3.871
Maximum Detected	190	Maximum Detected	5.247
Mean of Detected	117	Mean of Detected	4.628
SD of Detected	64.67	SD of Detected	0.623
Minimum Non-Detect	350	Minimum Non-Detect	5.858
Maximum Non-Detect	1700	Maximum Non-Detect	7.438
ا Note: Data have multiple DLs - Use of KM Method is recommen	ded	Number treated as Non-Detect	7
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	C
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
		Detected Values in this data	
	en though boots	trap may be performed on this data set	
the reculting coloulations	may not be relie		
· · · · · · · · · · · · · · · · · · ·		ervations for accurate and meaningful results.	
· · · · · · · · · · · · · · · · · · ·	ore distinct obse	ervations for accurate and meaningful results.	
It is recommended to have 10-15 or mo		ervations for accurate and meaningful results.	lv
It is recommended to have 10-15 or more and the second sec	ore distinct obse	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl	
It is recommended to have 10-15 or more and the second sec	UCL Statisti	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic	0.95
It is recommended to have 10-15 or more and the second sec	ore distinct obse	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	ly 0.95 0.748
It is recommended to have 10-15 or monomer of the Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level	UCL Statisti	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	0.95
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level Assuming Normal Distribution	UCL Statisti	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.95
It is recommended to have 10-15 or monomer of the Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level	UCL Statisti 0.952 0.748	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	0.95 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level Assuming Normal Distribution	UCL Statisti	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.95 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD	UCL Statisti 0.952 0.748	ervations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD	0.95 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	UCL Statisti 0.952 0.748	ervations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.95 0.748 5.185 0.941
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Statisti 0.952 0.748  264 276.5 467	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL	0.95 0.748 5.185 0.941
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.952 0.748  264 276.5	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method	0.95 0.748 5.185 0.941 1079
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Statisti 0.952 0.748  264 276.5 467	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale	0.95 0.748 5.185 0.941 1079 4.628
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.952 0.748  264 276.5 467	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Log Scale	0.95 0.748 5.185 0.941 1079 4.628 0.44
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.952 0.748  264 276.5 467	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale	0.95 0.748 5.185 0.941 1079 4.628 0.44 110.7
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.952 0.748  264 276.5 467	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale	0.95 0.748 5.185 0.941 1079 4.628 0.44 110.7 46.4
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.952 0.748  264 276.5 467	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Coriginal Scale  SD in Original Scale  95% t UCL	0.95 0.748 5.185 0.941 1079 4.628 0.44 110.7 46.4 144.8
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.952 0.748  264 276.5 467	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  95% t UCL  95% Percentile Bootstrap UCL	0.95 0.748 5.185 0.941 1079 4.628 0.44 110.7 46.4 137.8
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.952 0.748  264 276.5 467	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Coriginal Scale  SD in Original Scale  95% t UCL	0.95 0.748 5.185 0.941 1079 4.628 0.44

INDENO(1,2,3-CD)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only	1	Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.136	Data appear Normal at 5% Significance Level	
Theta Star	103		
nu star	9.089		
A-D Test Statistic	0.273	Nonparametric Statistics	
5% A-D Critical Value	0.659	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.659	Mean	11
5% K-S Critical Value	0.396	SD	56.01
Data appear Gamma Distributed at 5% Significance Le	vel	SE of Mean	32.3
		95% KM (t) UCL	179.8
Assuming Gamma Distribution		95% KM (z) UCL	170.2
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	184.:
Minimum	48	95% KM (bootstrap t) UCL	185.9
Maximum	190	95% KM (BCA) UCL	166
Mean	117.2	95% KM (Percentile Bootstrap) UCL	170
Median	117.4	95% KM (Chebyshev) UCL	25
SD	45.73	97.5% KM (Chebyshev) UCL	318.9
k star	3.907	99% KM (Chebyshev) UCL	438.
Theta star	29.99		
Nu star	54.69	Potential UCLs to Use	
AppChi2	38.7	95% KM (t) UCL	179.
95% Gamma Approximate UCL (Use when n >= 40)	165.6	95% KM (Percentile Bootstrap) UCL	170
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight	t, the user m	ay want to consult a statistician.	

BERYLLIUM			
	General S	tatistics	
Number of Valid Data	6	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	1
Number of Missing Values	1	Percent Non-Detects	16.67%
Trumber of tribasing values	1	1 Clock Non-Deceds	10.07 70
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.18	Minimum Detected	-1.715
Maximum Detected	3.5	Maximum Detected	1.253
Mean of Detected	0.99	Mean of Detected	-0.627
SD of Detected	1.41	SD of Detected	1.132
Minimum Non-Detect	0.2	Minimum Non-Detect	-1.609
Maximum Non-Detect	0.2	Maximum Non-Detect	-1.609
		etected Values in this data	
		potstrap may be performed on this data set	
the resulting calculations	may not be r	eliable enough to draw conclusions	
la la manamana de dita la 1 40 40			
it is recommended to have 10-15 or m	ore distinct o	bservations for accurate and meaningful results.	
it is recommended to have 10-15 or m	ore distinct o	bservations for accurate and meaningful results.	
it is recommended to have 10-15 or m		-	
	UCL Sta	tistics	
Normal Distribution Test with Detected Values Only	UCL Sta	tistics  Lognormal Distribution Test with Detected Values Only	/
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	UCL Sta	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	0.878
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	UCL Sta	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.878 0.762
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	UCL Sta	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	0.878
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	UCL Sta	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level	0.878
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level Assuming Normal Distribution	UCL Sta	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.878
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	UCL Sta	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	0.878 0.762
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	UCL Sta 0.646 0.762 0.842	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.878 0.762 -0.907
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	UCL Sta 0.646 0.762 0.842 1.312	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	0.878 0.762 -0.907 1.222
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	UCL Sta 0.646 0.762 0.842	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.878 0.762 -0.907
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Sta 0.646 0.762 0.842 1.312	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.878 0.762 -0.907 1.222
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	UCL Sta 0.646 0.762 0.842 1.312	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	-0.907 1.222 12.37
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Sta 0.646 0.762 0.842 1.312 1.921	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale	-0.907 1.222 12.37
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD	UCL Sta 0.646 0.762 0.842 1.312 1.921 0.473 1.58	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	-0.907 1.222 12.37 -0.874 1.18
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean	UCL Sta 0.646 0.762 0.842 1.312 1.921	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale	-0.907 1.222 12.37
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD	UCL Sta 0.646 0.762 0.842 1.312 1.921 0.473 1.58	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	-0.907 1.222 12.37 -0.874 1.18
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD 95% MLE (t) UCL	UCL Sta 0.646 0.762 0.842 1.312 1.921 0.473 1.58 1.773	Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	-0.907 1.222 12.37 -0.874 0.845
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD 95% MLE (t) UCL	UCL Sta 0.646 0.762 0.842 1.312 1.921 0.473 1.58 1.773	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale 95% t UCL	-0.907 1.222 12.37 -0.874 1.18 0.845 1.31
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method Mean SD 95% MLE (t) UCL	UCL Sta 0.646 0.762 0.842 1.312 1.921 0.473 1.58 1.773	tistics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	-0.907 1.222 12.37 -0.874 1.18 0.845 1.31

BERYLLIUM (Continued)			
Gamma Distribution Test with Detected Values Only	y	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.51	Data Follow Appr. Gamma Distribution at 5% Significance L	evel
Theta Star	1.941	1.	
nu star	5.1		
A-D Test Statistic	0.647	Nonparametric Statistics	
5% A-D Critical Value	0.693	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.693	Mean	0.855
5% K-S Critical Value	0.365	SD	1.19
Data follow Appr. Gamma Distribution at 5% Significance	Level	SE of Mean	0.543
••		95% KM (t) UCL	1.95
Assuming Gamma Distribution		95% KM (z) UCL	1.748
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.919
Minimum	0.000001	95% KM (bootstrap t) UCL	8.123
Maximum	3.5	95% KM (BCA) UCL	1.945
Mean	0.825	95% KM (Percentile Bootstrap) UCL	1.883
Median	0.365	95% KM (Chebyshev) UCL	3.223
SD	1.324	97.5% KM (Chebyshev) UCL	4.247
k star	0.245	99% KM (Chebyshev) UCL	6.26
Theta star	3.373		
Nu star	2.935	Potential UCLs to Use	
AppChi2	0.353	95% KM (Chebyshev) UCL	3.223
95% Gamma Approximate UCL (Use when n >= 40)	6.852		
95% Adjusted Gamma UCL (Use when n < 40)	15.27		
Note: DL/2 is not a recommended method.			
		vided to help the user to select the most appropriate 95% UCL.	
		lation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insigh	t, the user ma	ay want to consult a statistician.	

CADMIUM			
	General S	Statistics	
Number of Valid Data	7	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	6
		Percent Non-Detects	85.71%
Warning: Only one distinct data value was detected	di Prolici /	or any other software) should not be used on such a data set!	
		Project Team to estimate environmental parameters (e.g., EPC	, BTV).
The data set for	variable CA	DMIUM was not processed!	
		•	

	General UCL Statistics for	or Full Data	Sate	
User Selected Options		or r un Data	066	
From File		s\Newport\De	erecktor\Draft Final Risk Assessment\EPCs\Unpaved Surface So	oil - Building
Full Precision	OFF			
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
Training of Deciding operations				
ALUMINUM				
		Conoral	Chatiatian	
Num	nber of Valid Observations		Statistics  Number of Distinct Observations	6
	Number of Missing Values		Number of Distinct Observations	U
	vulliber of Missing values	I		
Raws	Statistics		Log-transformed Statistics	
	Minimum	3810	Minimum of Log Data	8 245
	Maximum		Maximum of Log Data	9.333
	Mean		Mean of log Data	
	Geometric Mean		SD of log Data	
	Median		52 51 10g Data	
		3245		
	Std. Error of Mean			
	Coefficient of Variation			
	Skewness			
It is	suggested to collect at lea	est 8 to 10 ob	ecompute meaningful and reliable test statistics and estimates!  servations using these statistical methods!  ves (DQO) based sample size and analytical results.	
			nly 6 Values in this data	
Note: It s			trap methods may be performed on this data set,	
	the resulting calculations	s may not be	reliable enough to draw conclusions	
The literatur	e suggests to use bootstra	ap methods	on data sets having more than 10-15 observations.	
		Relevant U	CL Statistics	
Normal Dis	tribution Test		Lognormal Distribution Test	
		T		
	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
	Shapiro Wilk Test Statistic			
Data appear Normal a	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level		Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level	
Data appear Normal a	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level rmal Distribution	0.788	Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.788
Data appear Normal a Assuming No	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level rmal Distribution 95% Student's-t UCL	0.788	Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  95% H-UCL	13084
Data appear Normal a  Assuming No  95% UCLs (Adji	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level  rmal Distribution 95% Student's-t UCL usted for Skewness)	0.788	Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  95% H-UCL  95% Chebyshev (MVUE) UCL	0.788 13084 13814
Data appear Normal a  Assuming No  95% UCLs (Adji 95% Adjust	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value at 5% Significance Level rmal Distribution 95% Student's-t UCL	0.788	Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  95% H-UCL	13084 13814 16508

MINUM (Continued)		T
Gamma Distribution Test		Data Distribution
k star (bias corrected)	3.136	Data appear Normal at 5% Significance Level
Theta Star	2413	
MLE of Mean	7567	
MLE of Standard Deviation	4273	
nu star		
Approximate Chi Square Value (.05)	24.59	Nonparametric Statistics
Adjusted Level of Significance	0.0122	95% CLT UCL 9746
Adjusted Chi Square Value	20.86	95% Jackknife UCL 10236
		95% Standard Bootstrap UCL 9556
Anderson-Darling Test Statistic	0.563	95% Bootstrap-t UCL 10356
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 8834
Kolmogorov-Smirnov Test Statistic	0.303	95% Percentile Bootstrap UCL 9605
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 9622
Data appear Gamma Distributed at 5% Significance L	.evel	95% Chebyshev(Mean, Sd) UCL 13342
		97.5% Chebyshev(Mean, Sd) UCL 1584
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 20749
95% Approximate Gamma UCL (Use when n >= 40)		
95% Adjusted Gamma UCL (Use when n < 40)	13649	
Potential UCL to Use		Use 95% Student's-t UCL 10236
Note: Suggestions regarding the selection of a 95%	UCL are p	rovided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the res	ults of the s	imulation studies summarized in Singh, Singh, and laci (2002)
and Singh and Singh (2003). For	additional in	sight, the user may want to consult a statistician.
		kewed data, confidence limits
		rmal, and Gamma) may not be
reliable. Ch	nen's and Jo	hnson's methods provide
adjustme	nts for posit	vely skewed data sets.

	General Sta		
Number of Valid Observations	7	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	2.6	Minimum of Log Data	0.95
Maximum		Maximum of Log Data	3.16
	11.91	Mean of log Data	
Geometric Mean	9.058	SD of log Data	0.86
Median			
	8.172		
Std. Error of Mean			
Coefficient of Variation			
Skewness	0.184		
Warning: A sample size of 'n' = 7 may not adequa	te enough to co	ompute meaningful and reliable test statistics and estimates!	
It is suggested to collect at lea	ist 8 to 10 obse	ervations using these statistical methods!	
If possible compute and collect Data Qu	iality Objectives	s (DQO) based sample size and analytical results.	
		7 Values in this data	
		p methods may be performed on this data set,	
the resulting calculation	s may not be re	eliable enough to draw conclusions	
The literature suggests to use bootstr	ap methods on	data sets having more than 10-15 observations.	
	Deleventuol	Otobiobios	
Normal Distribution Test	Relevant UCL		
Normal Distribution Test Shapiro Wilk Test Statistic	0.02	Lognormal Distribution Test Shapiro Wilk Test Statistic	0 00
Shapiro Wilk Critical Value		Shapiro Wilk Test Statistic Shapiro Wilk Critical Value	
Data appear Normal at 5% Significance Level	0.603	Data appear Lognormal at 5% Significance Level	0.60
Data appear Normal at 0 % Oignineance Level		Data appear Logilormar at 0 % dignilicance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	17.92	95% H-UCL	42.4
95% UCLs (Adjusted for Skewness)	11102	95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)	17.22	97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)	17.95	99% Chebyshev (MVUE) UCL	
,	'		
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.223	Data appear Normal at 5% Significance Level	
Theta Star		•	
MLE of Mean			
MLE of Standard Deviation			
nu star	17.13		
		Nonparametric Statistics	
Approximate Chi Square Value (.05)		95% CLT UCL	
Approximate Chi Square Value (.05) Adjusted Level of Significance		95% Jackknife UCL	
Approximate Chi Square Value (.05)			
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	7.034	95% Standard Bootstrap UCL	
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	7.034 0.379	95% Standard Bootstrap UCL 95% Bootstrap-t UCL	
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	7.034 0.379 0.715	95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL	16.2
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	7.034 0.379 0.715 0.213	95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	16.2 16.6
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	7.034 0.379 0.715 0.213 0.315	95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	16.2 16.6 16.4
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	7.034 0.379 0.715 0.213 0.315	95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	16.2 16.6 16.4 25.3
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	7.034 0.379 0.715 0.213 0.315	95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	16.2 16.6 16.4 25.3 31.2
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	7.034 0.379 0.715 0.213 0.315 evel	95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	16.2 16.6 16.4 25.3 31.2
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	7.034 0.379 0.715 0.213 0.315 evel	95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	16.2 16.6 16.4 25.3 31.2
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	7.034 0.379 0.715 0.213 0.315 evel	95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	16.2 16.6 16.4 25.3 31.2
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	7.034 0.379 0.715 0.213 0.315 evel	95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL	16.2 16.6 16.4 25.3 31.2 42.6
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	7.034 0.379 0.715 0.213 0.315 evel	95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	16.2 16.6 16.4 25.3 31.2 42.6
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use	7.034 0.379 0.715 0.213 0.315 <b>evel</b> 23.29 29.01	95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL	16.2 16.4 25.3 31.2 42.6

	General	Statistics
Number of Valid Observations		Number of Distinct Observations 7
	1	
Raw Statistics		Log-transformed Statistics
Minimum		Minimum of Log Data 1.85
Maximum		Maximum of Log Data 4.86
Mean Geometric Mean	33.86	Mean of log Data 3.03 SD of log Data 0.93
Geometric Mean Median		SD of log Data 0.9
	43.72	
Std. Error of Mean		
Coefficient of Variation		
Skewness	2.348	
It is suggested to collect at lea	ast 8 to 10 ob	ocompute meaningful and reliable test statistics and estimates!  Discriptions using these statistical methods!  Discriptions using these statistical methods!  Discriptions using these statistical methods!
		nly 7 Values in this data
		trap methods may be performed on this data set,
the resulting calculation	s may not be	reliable enough to draw conclusions
I he literature suggests to use bootstr	ap methods o	on data sets having more than 10-15 observations.
	Pelevant I I	CL Statistics
Normal Distribution Test	Trelevant Or	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.647	Shapiro Wilk Test Statistic 0.90
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value 0.80
Data not Normal at 5% Significance Level	10000	Data appear Lognormal at 5% Significance Level
<u> </u>		5
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	65.96	95% H-UCL 142
95% UCLs (Adjusted for Skewness)	T===	95% Chebyshev (MVUE) UCL 80.
95% Adjusted-CLT UCL (Chen-1995)		97.5% Chebyshev (MVUE) UCL 101
95% Modified-t UCL (Johnson-1978)	68.41	99% Chebyshev (MVUE) UCL 143
Gamma Distribution Test		Data Distribution
k star (bias corrected)	0.758	Data Follow Appr. Gamma Distribution at 5% Significance Le
Theta Star		71
MLE of Mean		
	38.88	
MLE of Standard Deviation		
MLE of Standard Deviation nu star	10.61	
MLE of Standard Deviation nu star Approximate Chi Square Value (.05)	10.61 4.329	Nonparametric Statistics
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance	10.61 4.329 0.0158	95% CLT UCL 61.0
MLE of Standard Deviation nu star Approximate Chi Square Value (.05)	10.61 4.329 0.0158	95% CLT UCL 61.0 95% Jackknife UCL 65.0
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	10.61 4.329 0.0158 3.203	95% CLT UCL 61.0 95% Jackknife UCL 65.0 95% Standard Bootstrap UCL 59.7
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	10.61 4.329 0.0158 3.203	95% CLT UCL 61.0 95% Jackknife UCL 65.9 95% Standard Bootstrap UCL 59.7 95% Bootstrap-t UCL 240
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	10.61 4.329 0.0158 3.203 0.681 0.725	95% CLT UCL 61.0 95% Jackknife UCL 65.9 95% Standard Bootstrap UCL 59.7 95% Bootstrap-t UCL 240 95% Hall's Bootstrap UCL 240
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	10.61 4.329 0.0158 3.203 0.681 0.725 0.321	95% CLT UCL 61.0 95% Jackknife UCL 65.9 95% Standard Bootstrap UCL 59.7 95% Bootstrap-t UCL 240 95% Hall's Bootstrap UCL 240 95% Percentile Bootstrap UCL 64.7
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	10.61 4.329 0.0158 3.203 0.681 0.725 0.321 0.319	95% CLT UCL 61.0 95% Jackknife UCL 65.9 95% Standard Bootstrap UCL 59.7 95% Bootstrap-t UCL 240 95% Hall's Bootstrap UCL 240 95% Percentile Bootstrap UCL 64.7 95% BCA Bootstrap UCL 78.9
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	10.61 4.329 0.0158 3.203 0.681 0.725 0.321 0.319	95% CLT UCL 61.0 95% Jackknife UCL 65.9 95% Standard Bootstrap UCL 59.7 95% Bootstrap-t UCL 240 95% Hall's Bootstrap UCL 240 95% Percentile Bootstrap UCL 64.7 95% BCA Bootstrap UCL 78.9 95% Chebyshev(Mean, Sd) UCL 105
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance	10.61 4.329 0.0158 3.203 0.681 0.725 0.321 0.319	95% CLT UCL 61.0 95% Jackknife UCL 65.9 95% Standard Bootstrap UCL 59.0 95% Bootstrap-t UCL 240 95% Hall's Bootstrap UCL 240 95% Percentile Bootstrap UCL 64.0 95% BCA Bootstrap UCL 78.9 95% Chebyshev(Mean, Sd) UCL 105 97.5% Chebyshev(Mean, Sd) UCL 137
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance Assuming Gamma Distribution	10.61 4.329 0.0158 3.203 0.681 0.725 0.321 0.319 e Level	95% CLT UCL 61.0 95% Jackknife UCL 65.9 95% Standard Bootstrap UCL 59.7 95% Bootstrap-t UCL 240 95% Hall's Bootstrap UCL 240 95% Percentile Bootstrap UCL 64.7 95% BCA Bootstrap UCL 78.9 95% Chebyshev(Mean, Sd) UCL 105
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance	10.61 4.329 0.0158 3.203 0.681 0.725 0.321 0.319 e Level	95% CLT UCL 61.0 95% Jackknife UCL 65.9 95% Standard Bootstrap UCL 59.0 95% Bootstrap-t UCL 240 95% Hall's Bootstrap UCL 240 95% Percentile Bootstrap UCL 64.0 95% BCA Bootstrap UCL 78.9 95% Chebyshev(Mean, Sd) UCL 105 97.5% Chebyshev(Mean, Sd) UCL 137
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	10.61 4.329 0.0158 3.203 0.681 0.725 0.321 0.319 e Level	95% CLT UCL 61.0 95% Jackknife UCL 65.9 95% Standard Bootstrap UCL 59.0 95% Bootstrap-t UCL 240 95% Hall's Bootstrap UCL 240 95% Percentile Bootstrap UCL 64.0 95% BCA Bootstrap UCL 78.9 95% Chebyshev(Mean, Sd) UCL 105 97.5% Chebyshev(Mean, Sd) UCL 137
MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	10.61 4.329 0.0158 3.203 0.681 0.725 0.321 0.319 e Level	95% CLT UCL 61.0 95% Jackknife UCL 65.9 95% Standard Bootstrap UCL 59.0 95% Bootstrap-t UCL 240 95% Hall's Bootstrap UCL 240 95% Percentile Bootstrap UCL 64.0 95% BCA Bootstrap UCL 78.9 95% Chebyshev(Mean, Sd) UCL 105 97.5% Chebyshev(Mean, Sd) UCL 137

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Number of Valid Observations   6 Number of Missing Values   1 Number of Missing Values   1 Raw Statistics    Raw Statistics			Statistics	
Raw Statistics  Minimum   3.3   Minimum of Log Data   1.19  Maximum   23.9   Maximum of Log Data   1.19  Mean   12.42   Mean of log Data   2.27  Geometric Meen   9.754   SD of log Data   2.27  Median   10.25   SD   5.65  Std. Error of Mean   3.538   Coefficient of Variation   0.698   Skewness   0.451    Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable teet statistics and estimates!  It is suggested to collect at least 8 to 10 observations using these statistical methods!  If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  Warning: There are only 6 Values in this data  Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions  The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.  Relevant UCL Statletios  Normal Distribution Test Shapiro Wilk Test Statistic   0.893   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.788   Data appear Normal 15% Significance Level  Assuming Normal Distribution  95% Student's-t UCL   19.55   95% Lotyshev (MVUE) UCL   3.2   95% Adjusted-CLT UCL (Chen-1935)   19.8   95% Suddent's-t UCL   42.8   95% Modified-t UCL (Jehnon-1973)   9.6   99% Chebyshev (MVUE) UCL   3.2   95% Adjusted-CLT UCL (Chen-1935)   19.6   99% Standard Bootstrap UCL   18.2   95% Adjusted Chi Siquare Value   0.79   9.8   9.9			Number of Distinct Observations	6
Minimum   3.3   Minimum of Log Data   3.17   Mean   10.42   Mean of Log Data   3.17   Mean   10.42   Mean of Log Data   3.17   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   2.79   Median   10.25   SD of log Data   10.25   SD of log Da	Number of Missing values	I		
Maximum [23.9   Maximum of Log Data   227	Raw Statistics		Log-transformed Statistics	
Mean of log Data   2.27				
Geometric Mean in 7:54				
Median   10,25   S1d. Error of Mean   3,538				
SD 8, 665 Std. Error of Mean 3,538 Coefficient of Variation (0,698 Skewness) (0,451  Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!  It is suggested to collect at least 8 to 10 observations using these statistical methods!  If possible compute and collect Data Quality Objectives (DQC) based sample size and analytical results.  Warning: There are only 6 Values in this data Note: It should be noted that even through bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough be draw conclusions  The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.  Relevant UCL Statistics Normal Distribution Test Shapiro Wilk Test Statistic   0.93 Shapiro Wilk Critical Value   0.788 Data appear Normal at 5% Significance Level  Assuming Normal Distribution  95% Student's-t UCL   19.55 95% LDCLs (Adjusted for Skewness) 95% Student's-t UCL   19.55 95% LDCLs (Adjusted for Skewness) 95% Modified-t UCL (Chen-1999)   18.93 95% Modified-t UCL (Lothonson-1978)   19.55  Gamma Distribution Test  Late Data Distribution  k star (bias corrected)   1.23 MLE of Standard Deviation   11.23 MLE of Mean   12.42 MLE of Standard Deviation   12.42 MLE of Standard Deviation   12.42 MLE of Standard Deviation   12.42 MLE of Standard Deviation   12.42 MLE of Standard Deviation   12.42 MLE of Standard Deviation   12.42 MLE of Mean   12.42 MLE of Standard Deviation   12.43 MLE of Standard Deviation   12.43 MLE of Mean   12.42 MLE of Standard Deviation   12.43 MLE of Mean   12.42 MLE of Standard Deviation   12.43 MLE of Standard Deviation   12.43 MLE of Mean   12.42 MLE of Mean   12.42 MLE of Standard Deviation   12.43 MLE of Standard Deviation   12.43 MLE of Mean   12.43 MLE of Standard Deviation   12.43 MLE of Standard Deviation   12.43 MLE of Standard Deviation   12.43 MLE of Standard Deviation   12.44 MLE of Standard Deviation   12.45 MLE of Mean   12.45 MLE of Standard Deviation   12.45			SD or log Data	0.79
Side. Error of Meani 3.538 Coefficient of Variation (9.698 Skewness) 0.451  Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!  It is suggested to collect at least 8 to 10 observations using these statistical methods!  If possible compute and collect Data Quality Objectives (DQC) based sample size and analytical results.  Warning: There are only 6 Values in this data  Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions  The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.  Relevant UCL Statistics  Normal Distribution Test Shapiro Wilk Treal Statistic (0.893 Shapiro Wilk Test Statistic (0.893 Shapiro Wilk Test Statistic (0.893 Shapiro Wilk Test Statistic (0.984) Shapiro Wilk Test Statistic (0.985) Shapiro Wilk Test Statistic (0.986) Shapiro Wilk Test Statistic (0.986) Shapiro Wilk Test Statistic (0.987) Data appear Normal at 5% Significance Level  Assuming Normal Distribution  95% Student's-t UCL   19.55  95% UCLs (Adjusted Crit UCL (Chen-1995)   18.93  95% Chebyshev (MVUE) UCL   3.02  95% Adjusted-LCT UCL (Chen-1995)   18.93  95% Modified UCL (Johnson-1998)   19.55  95% Modified UCL (Johnson-1998)   19.55  95% Modified UCL (Johnson-1998)   19.55  95% Modified UCL (Johnson-1998)   19.55  95% Modified UCL (Johnson-1998)   19.55  95% Modified UCL (Johnson-1998)   19.55  95% Modified UCL (Johnson-1998)   19.55  95% Chebyshev (MVUE) UCL   3.8  Approximate Chi Square Value (0.91) 7.038  Anderson-Darling Test Statistic (0.208  Approximate Chi Square Value (0.91) 7.038  Anderson-Darling Test Statistic (0.208  95% Chebyshev (Mean, Sd) UCL (1.78  Anderson-Darling Test Statistic (0.208  95% Chebyshev (Mean, Sd) UCL (1.78  95% Adjusted Chi Square Value (0.35)  95% Abgusted Gamma UCL (Use when n × 40)   25.89  95% Abgusted Gamma UCL (Use when n × 40)   25.89  95% Adjusted Gamma UCL (Use when				
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!  It is suggested to collect at least 8 to 10 observations using these statistical methods!  If possible compute and collect Data Quality Objectives (DCO) based sample size and analytical results.  Warning: There are only 6 Values in this data  Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions  The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.  Relevant UCI. Statistics  Normal Distribution Test  Shapiro Wilk Test Statistic   0.893 Shapiro Wilk Critical Value   0.788  Data appear Normal at 5% Significance Level  Assuming Normal Distribution  95% Student's-t UCI. 19.55  95% Clcls (Adjusted for Skewness)  95% Student's-t UCI. 19.55  95% Adjusted-CI-T UCI. (Chen-1995)   19.95  95% Adjusted-CI-T UCI. (Chen-1995)   19.95  Gamma Distribution Test  Data Distribution  Rata (Lohnson-1978)   19.95  Gamma Distribution Test  Adjusted Level of Significance Level  Adjusted Chel Square Value (0.5)   70.38  Adjusted Chel Square Value (0.5)   70.38  Adjusted Chel Square Value (0.5)   70.38  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Test Statistic   0.31  Anderson-Darling Sw. Critical Value   0.704  95% Approximate Bootstrap UCI.   13.5  Aliance Chi Square Value   0.75  Assuming G				
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!  It is suggested to collect at least 8 to 10 observations using these statistical methods!  If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.    Warning: There are only 6 Values in this data				
It is suggested to collect at least 8 to 10 observations using these statistical methods!  If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  Warning: There are only 6 Values in this data  Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions  The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.  Relevant UCL Statistics  Normal Distribution Test Shapiro Wilk Test Statistic   0.893   Shapiro Wilk Test Statistic   0.93   Shapiro Wilk Test Statistic   0.93   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.788   Data appear Lognormal at 5% Significance Level  Assuming Normal Distribution	Skewness	0.451		
Warning: There are only 6 Values in this data	Warning: A sample size of 'n' = 6 may not adequa	te enough to	compute meaningful and reliable test statistics and estimates!	
Warning: There are only 6 Values in this data  Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions  The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.  Relevant UCL Statistics  Normal Distribution Test Shapiro Wilk Test Statistic   0.893 Shapiro Wilk Test Statistic   0.893 Shapiro Wilk Test Statistic   0.893 Shapiro Wilk Test Statistic   0.893 Shapiro Wilk Test Statistic   0.893 Shapiro Wilk Test Statistic   0.938 Shapiro Wilk Test Stat				
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions  The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.  Relevant UCL Statistics  Normal Distribution Test Shapiro Wilk Test Statistic   0.993   Shapiro Wilk Test Statistic   0.933   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Cri	ir possible compute and collect Data Qu	iality Objecti	ves (DQO) based sample size and analytical results.	
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions  The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.  Relevant UCL Statistics  Normal Distribution Test Shapiro Wilk Test Statistic   0.993   Shapiro Wilk Test Statistic   0.933   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.784   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Critical Value   0.785   Shapiro Wilk Cri	Warning:	There are or	nly 6 Values in this data	
Relevant UCL Statistics   Relevant UCL Statistics   Normal Distribution Test   Shapiro Wilk Test Statistic   0.893   Shapiro Wilk Test Statistic   0.893   Shapiro Wilk Test Statistic   0.94   Shapiro Wilk Test Statistic   0.94   Shapiro Wilk Test Statistic   0.95   S	Note: It should be noted that even t	hough boots	trap methods may be performed on this data set,	
Relevant UCL Statistics   Lognormal Distribution Test   Shapiro Wilk Test Statistic   0.93   Shapiro Wilk Test Statistic   0.93   Shapiro Wilk Test Statistic   0.93   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.78   Data appear Normal at 5% Significance Level   Data appear Lognormal at 5% Significance Level   Data appear Lognormal Distribution   95% Student's-t UCL   19.55   95% LOLS (Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   30.2   95% Adjusted-CLT UCL (Chen-1995)   18.93   97.5% Chebyshev (MVUE) UCL   37.8   95% Modified-t UCL (Johnson-1978)   19.65   99% Chebyshev (MVUE) UCL   52.8   95% Modified-t UCL (Johnson-1978)   19.65   99% Chebyshev (MVUE) UCL   52.8   Data appear Normal at 5% Significance Level   1.223   Data appear Normal at 5% Significance Level   1.224   MLE of Standard Deviation   11.23   nu star   14.68   Approximate Chi Square Value   50.5   7.038   Nonparametric Statistics   Adjusted Level of Significance   0.0122   95% CLT UCL   18.2   95% Standard Bootstrap UCL   18.2   Anderson-Darling Test Statistic   0.012   95% Bootstrap UCL   19.5   Nonparametric Statistics   95% Bootstrap UCL   19.5   Nonparamed Chi Square Value   0.704   95% Hall's Bootstrap UCL   19.5   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.704   95% Abotstrap UCL   18.2   Nonparamed Chi Square Value   0.704   95% Abotstrap UCL   18.2   Nonparamed Chi Square Value   0.704   95% Abotstrap UCL   18.2   Nonparamed Chi Square Value   0.704   95% Chebyshev (Mean, Sd) UCL   4.5   Nonpa	the resulting calculations	s may not be	e reliable enough to draw conclusions	
Relevant UCL Statistics   Lognormal Distribution Test   Shapiro Wilk Test Statistic   0.93   Shapiro Wilk Test Statistic   0.93   Shapiro Wilk Test Statistic   0.93   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.78   Data appear Normal at 5% Significance Level   Data appear Lognormal at 5% Significance Level   Data appear Lognormal Distribution   95% Student's-t UCL   19.55   95% LOLS (Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   30.2   95% Adjusted-CLT UCL (Chen-1995)   18.93   97.5% Chebyshev (MVUE) UCL   37.8   95% Modified-t UCL (Johnson-1978)   19.65   99% Chebyshev (MVUE) UCL   52.8   95% Modified-t UCL (Johnson-1978)   19.65   99% Chebyshev (MVUE) UCL   52.8   Data appear Normal at 5% Significance Level   1.223   Data appear Normal at 5% Significance Level   1.224   MLE of Standard Deviation   11.23   nu star   14.68   Approximate Chi Square Value   50.5   7.038   Nonparametric Statistics   Adjusted Level of Significance   0.0122   95% CLT UCL   18.2   95% Standard Bootstrap UCL   18.2   Anderson-Darling Test Statistic   0.012   95% Bootstrap UCL   19.5   Nonparametric Statistics   95% Bootstrap UCL   19.5   Nonparamed Chi Square Value   0.704   95% Hall's Bootstrap UCL   19.5   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.336   95% Percentile Bootstrap UCL   18.2   Nonparamed Chi Square Value   0.704   95% Abotstrap UCL   18.2   Nonparamed Chi Square Value   0.704   95% Abotstrap UCL   18.2   Nonparamed Chi Square Value   0.704   95% Abotstrap UCL   18.2   Nonparamed Chi Square Value   0.704   95% Chebyshev (Mean, Sd) UCL   4.5   Nonpa	The literature overcote to you bestetu		on data acts having mays than 10.15 shoot stions	
Normal Distribution Test   Shapiro Wilk Test Statistic   0.893   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Test Statistic   0.789   Sha	i ne literature suggests to use bootstra	ap metnods	on data sets naving more than 10-15 observations.	
Normal Distribution Test   Shapiro Wilk Test Statistic   0.893   Shapiro Wilk Critical Value   0.788   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Critical Value   0.789   Shapiro Wilk Test Statistic   0.789   Sha		Relevant U	CL Statistics	
Data appear Normal at 5% Significance Level	Normal Distribution Test			
Data appear Normal at 5% Significance Level				
Assuming Normal Distribution   95% Student's-t UCL   19.55   95% H-UCL   45.8		0.788		0.78
95% Student's-t UCL   19.55   95% Chebyshev (MVUE) UCL   30.2   95% Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   30.2   95% Adjusted-CLT UCL (Chen-1995)   18.93   97.5% Chebyshev (MVUE) UCL   37.8   95% Modified-t UCL (Johnson-1978)   19.65   99% Chebyshev (MVUE) UCL   52.8      Gamma Distribution Test   Data Distribution   Nature   Significance   Natur	Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
95% UCLs (Adjusted for Skewness)         95% Chebyshev (MVUE) UCL         30.2           95% Adjusted-CLT UCL (Chen-1995)         18.93         97.5% Chebyshev (MVUE) UCL         37.8           95% Modified-t UCL (Johnson-1978)         19.65         99% Chebyshev (MVUE) UCL         23.7           95% Modified-t UCL (Johnson-1978)         19.65         99% Chebyshev (MVUE) UCL         25.8           Gamma Distribution Test         Data Distribution           Nation of Main 12.42         Data appear Normal at 5% Significance Level           MLE of Mean 12.42           MLE of Mean 12.42           MLE of Mean 12.42           MLE of Standard Deviation 11.23           nu star 14.68           Approximate Chi Square Value (0.5) 7.038         Nonparametric Statistics           Adjusted Level of Significance 0.0122         95% CLT UCL 18.2           Adjusted Chi Square Value 5.246         95% Standard Bootstrap UCL 19.5           Anderson-Darling Test Statisticic 0.31         95% Standard Bootstrap UCL 19.5           Anderson-Darling 5% Critical Value 0.704         95% Hall's Bootstrap UCL 19.5           Kolmogorov-Smirnov Test Statistic 0.208         95% BCA Bootstrap UCL 18		19.55		45.8
95% Adjusted-CLT UCL (Chen-1995)   18.93   97.5% Chebyshev (MVUE) UCL   37.8     95% Modified-t UCL (Johnson-1978)   19.65   99% Chebyshev (MVUE) UCL   52.8     Gamma Distribution Test   Data Distribution		1.0.00		
Data Distribution Test   Star (bias corrected)   1.223   Data appear Normal at 5% Significance Level				
R star (bias corrected)   1.223   Data appear Normal at 5% Significance Level	95% Modified-t UCL (Johnson-1978)	19.65	99% Chebyshev (MVUE) UCL	52.8
R star (bias corrected)   1.223   Data appear Normal at 5% Significance Level	Ourse Bladford Tool		Data Distribution	
Theta Star   MLE of Mean   12.42		1 222		
MLE of Mean         12.42           MLE of Standard Deviation nu star         11.23           nu star         14.68           Approximate Chi Square Value (.05)         7.038           Adjusted Level of Significance D.0122         95% CLT UCL 18.2           Adjusted Chi Square Value S.246         95% Jackknife UCL 19.5           Anderson-Darling Test Statistic D.31         95% Bootstrap-t UCL 21.1           Anderson-Darling 5% Critical Value D.704         95% Hall's Bootstrap UCL 19.3           Kolmogorov-Smirnov Test Statistic D.208         95% Percentile Bootstrap UCL 18.1           Kolmogorov-Smirnov 5% Critical Value D.336         95% BCA Bootstrap UCL 18.1           Data appear Gamma Distributed at 5% Significance Level         95% Chebyshev(Mean, Sd) UCL 27.8           Assuming Gamma Distribution         99% Chebyshev(Mean, Sd) UCL 47.6           95% Approximate Gamma UCL (Use when n >= 40) 25.89         95% Adjusted Gamma UCL (Use when n < 40) 34.74			Data appear Normal at 5% Significance Level	
Nonparametric Statistics   Approximate Chi Square Value (.05)   7.038   Nonparametric Statistics				
Approximate Chi Square Value (.05)   7.038   Nonparametric Statistics				
Adjusted Level of Significance   0.0122   95% CLT UCL   18.2   Adjusted Chi Square Value   5.246   95% Jackknife UCL   19.5    Anderson-Darling Test Statistic   0.31   95% Bootstrap-t UCL   21.1    Anderson-Darling 5% Critical Value   0.704   95% Hall's Bootstrap UCL   19.3    Kolmogorov-Smirnov Test Statistic   0.208   95% Percentile Bootstrap UCL   18.1    Kolmogorov-Smirnov 5% Critical Value   0.336   95% BCA Bootstrap UCL   18.1    Data appear Gamma Distributed at 5% Significance Level   95% Chebyshev(Mean, Sd) UCL   27.8    97.5% Chebyshev(Mean, Sd) UCL   34.5    Assuming Gamma Distribution   99% Chebyshev(Mean, Sd) UCL   47.6    95% Approximate Gamma UCL (Use when n >= 40)   34.74    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL   Use When n   Value   Va			N 6	
Adjusted Chi Square Value   5.246   95% Jackknife UCL   19.5    Anderson-Darling Test Statistic   0.31   95% Bootstrap UCL   21.1    Anderson-Darling 5% Critical Value   0.704   95% Hall's Bootstrap UCL   19.3    Kolmogorov-Smirnov Test Statistic   0.208   95% Percentile Bootstrap UCL   18.1    Kolmogorov-Smirnov 5% Critical Value   0.336   95% BCA Bootstrap UCL   18.1    Kolmogorov-Smirnov 5% Critical Value   0.336   95% Chebyshev(Mean, Sd) UCL   27.8    Data appear Gamma Distributed at 5% Significance Level   95% Chebyshev(Mean, Sd) UCL   27.8    97.5% Chebyshev(Mean, Sd) UCL   34.5    Assuming Gamma Distribution   99% Chebyshev(Mean, Sd) UCL   47.6    95% Approximate Gamma UCL (Use when n >= 40)   34.74    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL   Use When n   19.5				10 2
95% Standard Bootstrap UCL   17.8	Approximate Chi Square Value (.05)			
Anderson-Darling Test Statistic   0.31   95% Bootstrap-t UCL   21.1   Anderson-Darling 5% Critical Value   0.704   95% Hall's Bootstrap UCL   19.3   Kolmogorov-Smirnov Test Statistic   0.208   95% Percentile Bootstrap UCL   18.1   Kolmogorov-Smirnov 5% Critical Value   0.336   95% BCA Bootstrap UCL   18.1    Data appear Gamma Distributed at 5% Significance Level   95% Chebyshev(Mean, Sd) UCL   27.8    97.5% Chebyshev(Mean, Sd) UCL   34.5    Assuming Gamma Distribution   99% Chebyshev(Mean, Sd) UCL   47.6    95% Approximate Gamma UCL (Use when n >= 40)   25.89    95% Adjusted Gamma UCL (Use when n < 40)   34.74    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL   Use   Use 95% Student's-t UCL   19.5    Potential UCL   Use   Use 95% Student's-t UCL   19.5    Potential UCL   Use   Use 95% Student's-t UCL   19.5    Potential UCL   Use   Use 95% Student's UCL   19.5    Potential UCL   Use   Use 95% Student's UCL   19.5    Potential UCL   Use   Use 95% Student's UCL   19.5    Potential UCL   Use   USE 95% Student's UCL   19.5    Potential UCL	Approximate Chi Square Value (.05) Adjusted Level of Significance	0.0122		ר או
Anderson-Darling 5% Critical Value   0.704   95% Hall's Bootstrap UCL   19.3   Kolmogorov-Smirnov Test Statistic   0.208   95% Percentile Bootstrap UCL   18.1   Kolmogorov-Smirnov 5% Critical Value   0.336   95% BCA Bootstrap UCL   18.1   Data appear Gamma Distributed at 5% Significance Level   95% Chebyshev(Mean, Sd) UCL   27.8   97.5% Chebyshev(Mean, Sd) UCL   34.5   Assuming Gamma Distribution   99% Chebyshev(Mean, Sd) UCL   47.6   95% Approximate Gamma UCL (Use when n >= 40)   25.89   95% Adjusted Gamma UCL (Use when n < 40)   34.74    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL to Use   Use 95% Student's-t UCL   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL   Use When 1   19.5    Potential UCL	Approximate Chi Square Value (.05) Adjusted Level of Significance	0.0122	95% Jackknife UCL	
Note	Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	0.0122 5.246	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL	17.8 21.1
Data appear Gamma Distributed at 5% Significance Level         95% Chebyshev(Mean, Sd) UCL 34.5           Assuming Gamma Distribution         99% Chebyshev(Mean, Sd) UCL 47.6           95% Approximate Gamma UCL (Use when n >= 40) 25.89         95% Adjusted Gamma UCL (Use when n < 40) 34.74	Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	0.0122 5.246 0.31 0.704	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL	17.8 21.1 19.3
97.5% Chebyshev(Mean, Sd) UCL 34.5   Assuming Gamma Distribution   99% Chebyshev(Mean, Sd) UCL 47.6   95% Approximate Gamma UCL (Use when n >= 40) 25.89   95% Adjusted Gamma UCL (Use when n < 40) 34.74   Potential UCL to Use   Use 95% Student's-t UCL 19.5	Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	0.0122 5.246 0.31 0.704 0.208	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	17.8 21.1 19.3 18.1
Assuming Gamma Distribution         99% Chebyshev(Mean, Sd) UCL         47.6           95% Approximate Gamma UCL (Use when n >= 40)         25.89           95% Adjusted Gamma UCL (Use when n < 40)	Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	0.0122 5.246 0.31 0.704 0.208 0.336	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	17.8 21.1 19.3 18.1 18.1
95% Approximate Gamma UCL (Use when n >= 40)       25.89         95% Adjusted Gamma UCL (Use when n < 40)	Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	0.0122 5.246 0.31 0.704 0.208 0.336	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	17.8 21.1 19.3 18.1 18.1 27.8
95% Adjusted Gamma UCL (Use when n < 40) 34.74  Potential UCL to Use  Use 95% Student's-t UCL 19.5	Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	0.0122 5.246 0.31 0.704 0.208 0.336	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	17.8 21.1 19.3 18.1 18.1 27.8 34.5
Potential UCL to Use Use 95% Student's-t UCL 19.5	Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	0.0122 5.246 0.31 0.704 0.208 0.336 evel	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	17.8 21.1 19.3 18.1 18.1 27.8 34.5
	Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	0.0122 5.246 0.31 0.704 0.208 0.336 evel	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	17.8 21.1 19.3 18.1 18.1 27.8 34.5
Note: Suggestions regarding the selection of a 95% LICL are provided to help the user to select the most enprepriets 95% LICL	Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	0.0122 5.246 0.31 0.704 0.208 0.336 evel	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL. 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL. 97.5% Chebyshev(Mean, Sd) UCL. 99% Chebyshev(Mean, Sd) UCL.	17.8 21.1 19.3 18.1 18.1 27.8 34.5 47.6
NOTE: SUGGESTIONS FOR STORM THE SOLD FIRM OF SURVEY IN A SIGN PARTITION TO A PART OF MARK AND AND AND AND AND AND AND AND AND AND	Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	0.0122 5.246 0.31 0.704 0.208 0.336 evel	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL. 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL. 97.5% Chebyshev(Mean, Sd) UCL. 99% Chebyshev(Mean, Sd) UCL.	17.8 21.1 19.3 18.1 18.1 27.8 34.5 47.6

		Statistics	
Number of Valid Observations		Number of Distinct Observations	6
Number of Missing Values	1		
Raw Statistics		Log-transformed Statistics	
Minimum	7770	Minimum of Log Data	8.95
Maximum		Maximum of Log Data	
	22662	Mean of log Data	
Geometric Mean		SD of log Data	
Median	21800	, and the second	
SD	11437		
Std. Error of Mean			
Coefficient of Variation			
Skewness	0.035		
Warning: A sample size of 'n' = 6 may not adequa	te enough to	compute meaningful and reliable test statistics and estimates!	
		servations using these statistical methods! ves (DQO) based sample size and analytical results.	
ii possible compute and collect Data de	dinty Objecti	ves (Baco) based sample size and analytical results.	
Warning:	There are or	nly 6 Values in this data	
		trap methods may be performed on this data set,	
the resulting calculation	s may not be	reliable enough to draw conclusions	
The literature suggests to use bootstr	ap methods	on data sets having more than 10-15 observations.	
	Relevant U	CL Statistics	
Normal Distribution Test	I	Lognormal Distribution Test	
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.78
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution 95% Student's-t UCL	32070	Assuming Lognormal Distribution 95% H-UCL	5048
95% UCLs (Adjusted for Skewness)	02070	95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)	30413	97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)	32082	99% Chebyshev (MVUE) UCL	
1370 0 0 1 0 0 E (001110011 1070)	1	55.5 5.105,61107 (III 7 0 2 ) 60E	
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.119	Data appear Normal at 5% Significance Level	
Theta Star		,,	
MLE of Mean	22662		
MLE of Standard Deviation	15568		
nu otor	25.43		
	14.04	Nonparametric Statistics	
Approximate Chi Square Value (.05)		050/ 017 1101	
Approximate Chi Square Value (.05) Adjusted Level of Significance	0.0122	95% CLT UCL	200
Approximate Chi Square Value (.05)	0.0122	95% Jackknife UCL	
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	0.0122 12.14	95% Jackknife UCL 95% Standard Bootstrap UCL	2954
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	0.0122 12.14 0.254	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL	295 <sup>4</sup> 3353
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	0.0122 12.14 0.254 0.7	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL	2954 3353 2967
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	0.0122 12.14 0.254 0.7 0.192	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	2954 3353 2967 2963
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	0.0122 12.14 0.254 0.7 0.192 0.334	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	2954 3353 2967 2963 2951
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	0.0122 12.14 0.254 0.7 0.192 0.334	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	2954 3353 2967 2963 2951 4301
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	0.0122 12.14 0.254 0.7 0.192 0.334	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	2954 3353 2967 2963 2951 4301 5182
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	0.0122 12.14 0.254 0.7 0.192 0.334 evel	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	2954 3353 2967 2963 2951 4301 5182
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	0.0122 12.14 0.254 0.7 0.192 0.334 evel	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	2954 3353 2963 2963 2953 4303 5182
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	0.0122 12.14 0.254 0.7 0.192 0.334 evel	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	2954 3353 2963 2963 2953 4303 5182
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	0.0122 12.14 0.254 0.7 0.192 0.334 evel	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL	2954 3353 2967 2963 2951 4301 5182 6912
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	0.0122 12.14 0.254 0.7 0.192 0.334 evel	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	2954 3353 2967 2963 2951 4301 5182 6912
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	0.0122 12.14 0.254 0.7 0.192 0.334 evel	95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL	2954 3353 2967 2963 2951 4301 5182 6912

	General S		_
Number of Valid Observations	7	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	9.7	Minimum of Log Data	2.27
Maximum		Maximum of Log Data	
Mean		Mean of log Data	
Geometric Mean		SD of log Data	1.06
Median			
	63.68		
Std. Error of Mean Coefficient of Variation			
Skewness			
GREWHESS	2.010		
Warning: A sample size of 'n' = 7 may not adequate	te enough to o	compute meaningful and reliable test statistics and estimates!	
		•	
It is suggested to collect at lea	st 8 to 10 obs	ervations using these statistical methods!	
If possible compute and collect Data Qu	ality Objective	es (DQO) based sample size and analytical results.	
		y 7 Values in this data	
		ap methods may be performed on this data set,	
the resulting calculations	s may not be r	reliable enough to draw conclusions	
The Basedon conservation is a section		- d-tt- b	
i ne literature suggests to use bootstra	ap metnoas or	n data sets having more than 10-15 observations.	
	Relevant UC	I Statistics	
Normal Distribution Test	Relevant OC	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.731	Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
Data not Normal at 5% Significance Level	0.000	Data appear Lognormal at 5% Significance Level	0.00
J		11 0	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	100.7	95% H-UCL	
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)	113.1	97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)	103.8	99% Chebyshev (MVUE) UCL	257.
		<b>-</b> . <b>-</b>	
		Data Distribution	
Gamma Distribution Test	0.700		ופעב
k star (bias corrected)		Data appear Gamma Distributed at 5% Significance Le	CVCI
k star (bias corrected) Theta Star	73.61	Data appear Gamma Distributed at 5% Significance Le	
k star (bias corrected) Theta Star MLE of Mean	73.61 53.94	Data appear Gamma Distributed at 5% Significance Le	
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation	73.61 53.94 63.01	Data appear Gamma Distributed at 5% Significance Le	
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star	73.61 53.94 63.01 10.26		
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05)	73.61 53.94 63.01 10.26 4.105	Nonparametric Statistics	
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star	73.61 53.94 63.01 10.26 4.105 0.0158		93.5
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance	73.61 53.94 63.01 10.26 4.105 0.0158	Nonparametric Statistics 95% CLT UCL	93.5
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance	73.61 53.94 63.01 10.26 4.105 0.0158 3.016	Nonparametric Statistics 95% CLT UCL 95% Jackknife UCL	93.5 100. 90.4
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	73.61 53.94 63.01 10.26 4.105 0.0158 3.016	Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL	93.5 100. 90.4 163
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	73.61 53.94 63.01 10.26 4.105 0.0158 3.016 0.449 0.726 0.241	Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL  95% Bootstrap-t UCL  95% Hall's Bootstrap UCL  95% Percentile Bootstrap UCL	93.5 100. 90.4 163 223 96.2
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	73.61 53.94 63.01 10.26 4.105 0.0158 3.016 0.449 0.726 0.241	Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL  95% Bootstrap-t UCL  95% Hall's Bootstrap UCL  95% Percentile Bootstrap UCL  95% BCA Bootstrap UCL	93.5 100. 90.4 163 223 96.2 111.
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	73.61 53.94 63.01 10.26 4.105 0.0158 3.016 0.449 0.726 0.241 0.319	Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL  95% Bootstrap-t UCL  95% Hall's Bootstrap UCL  95% Percentile Bootstrap UCL	93.5 100. 90.4 163 223 96.2 111.
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	73.61 53.94 63.01 10.26 4.105 0.0158 3.016 0.449 0.726 0.241 0.319	Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL  95% Bootstrap-t UCL  95% Hall's Bootstrap UCL  95% Percentile Bootstrap UCL  95% BCA Bootstrap UCL  95% BCA Bootstrap UCL  95% Chebyshev(Mean, Sd) UCL	93.5 100. 90.4 163 223 96.2 111. 158. 204.
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L Assuming Gamma Distribution	73.61 53.94 63.01 10.26 4.105 0.0158 3.016 0.449 0.726 0.241 0.319 evel	Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL  95% Bootstrap-t UCL  95% Hall's Bootstrap UCL  95% Percentile Bootstrap UCL  95% BCA Bootstrap UCL  95% BCA Bootstrap UCL	93.5 100. 90.4 163 223 96.2 111. 158. 204.
k star (bias corrected)  Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	73.61 53.94 63.01 10.26 4.105 0.0158 3.016 0.449 0.726 0.241 0.319 evel	Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL  95% Bootstrap-t UCL  95% Hall's Bootstrap UCL  95% Percentile Bootstrap UCL  95% BCA Bootstrap UCL  95% BCA Bootstrap UCL  95% Chebyshev(Mean, Sd) UCL	93.5 100. 90.4 163 223 96.2 111. 158. 204.
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L Assuming Gamma Distribution	73.61 53.94 63.01 10.26 4.105 0.0158 3.016 0.449 0.726 0.241 0.319 evel	Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL  95% Bootstrap-t UCL  95% Hall's Bootstrap UCL  95% Percentile Bootstrap UCL  95% BCA Bootstrap UCL  95% BCA Bootstrap UCL  95% Chebyshev(Mean, Sd) UCL	93.5 100. 90.4 163 223 96.2 111. 158. 204.
k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	73.61 53.94 63.01 10.26 4.105 0.0158 3.016 0.449 0.726 0.241 0.319 evel	Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL  95% Bootstrap-t UCL  95% Hall's Bootstrap UCL  95% Percentile Bootstrap UCL  95% BCA Bootstrap UCL  95% Chebyshev(Mean, Sd) UCL  97.5% Chebyshev(Mean, Sd) UCL	93.5 100. 90.4 163 223 96.2 111. 158. 204. 293.
k star (bias corrected)  Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	73.61 53.94 63.01 10.26 4.105 0.0158 3.016 0.449 0.726 0.241 0.319 evel	Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL  95% Bootstrap-t UCL  95% Hall's Bootstrap UCL  95% Percentile Bootstrap UCL  95% BCA Bootstrap UCL  95% BCA Bootstrap UCL  95% Chebyshev(Mean, Sd) UCL	93.5 100. 90.4 163 223 96.2 111. 158. 204. 293.

	General	Statistics
Number of Valid Observations	6	Number of Distinct Observations 6
Number of Missing Values	1	
Raw Statistics		Log-transformed Statistics
Minimum	157	Minimum of Log Data 5.05
Maximum		Maximum of Log Data 6.39
	365.5	Mean of log Data 5.79
Geometric Mean		SD of log Data 0.53
Median		
	174.1	
Std. Error of Mean		
Coefficient of Variation Skewness		
	1	compute meaningful and reliable test statistics and estimates!
It is suggested to collect at lea	ast 8 to 10 ol	pservations using these statistical methods! ves (DQO) based sample size and analytical results.
Worning	Thoro oro o	nly 6 Values in this data
		trap methods may be performed on this data set,
		e reliable enough to draw conclusions
the resulting calculation	3 may not be	reliable enough to draw conclusions
The literature suggests to use bootstr	an methods	on data sets having more than 10-15 observations.
	_рош.очо	
	Relevant U	CL Statistics
Normal Distribution Test		Lognormal Distribution Test
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic 0.92
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value 0.78
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution	T	Assuming Lognormal Distribution
95% Student's-t UCL	508.8	95% H-UCL 725.
95% UCLs (Adjusted for Skewness)	400 5	95% Chebyshev (MVUE) UCL 718.
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)		97.5% Chebyshev (MVUE) UCL 869. 99% Chebyshev (MVUE) UCL 116
95% Modified-t UCL (Johnson-1978)	508.9	99% Chebysnev (MVOE) OCL 116
Commo Dietribution Toet		Data Distribution
Gamma Distribution Test k star (bias corrected)	2.456	Data Distribution  Data appear Normal at 5% Significance Level
K star (blas corrected) Theta Star		Data appear Normal at 5 % Significance Level
MLE of Mean		
MLE of Standard Deviation		
	29.47	
		Nonparametric Statistics
	10.07	
Approximate Chi Square Value (.05)	0.0122	95% CLT UCL1482.
	0.0122	95% CLT UCL 482. 95% Jackknife UCL 508.
Approximate Chi Square Value (.05) Adjusted Level of Significance	0.0122	
Approximate Chi Square Value (.05) Adjusted Level of Significance	0.0122 14.95	95% Jackknife UCL 508.
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	0.0122 14.95 0.305	95% Jackknife UCL 508. 95% Standard Bootstrap UCL 470.
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	0.0122 14.95 0.305 0.699 0.228	95% Jackknife UCL 508. 95% Standard Bootstrap UCL 470. 95% Bootstrap-t UCL 517.
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	0.0122 14.95 0.305 0.699 0.228 0.333	95% Jackknife UCL 508. 95% Standard Bootstrap UCL 470. 95% Bootstrap-t UCL 517. 95% Hall's Bootstrap UCL 460. 95% Percentile Bootstrap UCL 474. 95% BCA Bootstrap UCL 474.
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	0.0122 14.95 0.305 0.699 0.228 0.333	95% Jackknife UCL 508. 95% Standard Bootstrap UCL 470. 95% Bootstrap-t UCL 517. 95% Hall's Bootstrap UCL 460. 95% Percentile Bootstrap UCL 474. 95% BCA Bootstrap UCL 474. 95% Chebyshev(Mean, Sd) UCL 675.
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	0.0122 14.95 0.305 0.699 0.228 0.333	95% Jackknife UCL 508. 95% Standard Bootstrap UCL 470. 95% Bootstrap-t UCL 517. 95% Hall's Bootstrap UCL 460. 95% Percentile Bootstrap UCL 474. 95% BCA Bootstrap UCL 474. 95% Chebyshev(Mean, Sd) UCL 675. 97.5% Chebyshev(Mean, Sd) UCL 809.
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	0.0122 14.95 0.305 0.699 0.228 0.333	95% Jackknife UCL 508. 95% Standard Bootstrap UCL 470. 95% Bootstrap-t UCL 517. 95% Hall's Bootstrap UCL 460. 95% Percentile Bootstrap UCL 474. 95% BCA Bootstrap UCL 474. 95% Chebyshev(Mean, Sd) UCL 675.
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	0.0122 14.95 0.305 0.699 0.228 0.333 .evel	95% Jackknife UCL 508. 95% Standard Bootstrap UCL 470. 95% Bootstrap-t UCL 517. 95% Hall's Bootstrap UCL 460. 95% Percentile Bootstrap UCL 474. 95% BCA Bootstrap UCL 474. 95% Chebyshev(Mean, Sd) UCL 675. 97.5% Chebyshev(Mean, Sd) UCL 809.
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	0.0122 14.95 0.305 0.699 0.228 0.333 .evel	95% Jackknife UCL 508. 95% Standard Bootstrap UCL 470. 95% Bootstrap-t UCL 517. 95% Hall's Bootstrap UCL 460. 95% Percentile Bootstrap UCL 474. 95% BCA Bootstrap UCL 474. 95% Chebyshev(Mean, Sd) UCL 675. 97.5% Chebyshev(Mean, Sd) UCL 809.
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	0.0122 14.95 0.305 0.699 0.228 0.333 .evel	95% Jackknife UCL 508. 95% Standard Bootstrap UCL 470. 95% Bootstrap-t UCL 517. 95% Hall's Bootstrap UCL 460. 95% Percentile Bootstrap UCL 474. 95% BCA Bootstrap UCL 474. 95% Chebyshev(Mean, Sd) UCL 675. 97.5% Chebyshev(Mean, Sd) UCL 809. 99% Chebyshev(Mean, Sd) UCL 1073
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	0.0122 14.95 0.305 0.699 0.228 0.333 .evel	95% Jackknife UCL 508. 95% Standard Bootstrap UCL 470. 95% Bootstrap-t UCL 517. 95% Hall's Bootstrap UCL 460. 95% Percentile Bootstrap UCL 474. 95% BCA Bootstrap UCL 474. 95% Chebyshev(Mean, Sd) UCL 675. 97.5% Chebyshev(Mean, Sd) UCL 809.
Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	0.0122 14.95 0.305 0.699 0.228 0.333 evel	95% Jackknife UCL 508. 95% Standard Bootstrap UCL 470. 95% Bootstrap-t UCL 517. 95% Hall's Bootstrap UCL 460. 95% Percentile Bootstrap UCL 474. 95% BCA Bootstrap UCL 474. 95% Chebyshev(Mean, Sd) UCL 675. 97.5% Chebyshev(Mean, Sd) UCL 809. 99% Chebyshev(Mean, Sd) UCL 1073

Former Building 234
Surface Soil

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	eneral UCL Statistics for	or Data Sets	with Non-Detects	
User Selected Options	Waste Faldons Ducio etc.	Marria ant Da	washtad Duck Final Diels Assassment (FDCs) Confess Cail Dividin	- 224 vla v
		\inewport\De	recktor\Draft Final Risk Assessment\EPCs\Surface Soil - Buildin	ig 234.xis.v
	5%			
	000			
Number of Bootstrap Operations   20	J00			
BENZO(A)ANTHRACENE				
.,		General S	Statistics	
	Number of Valid Data	8	Number of Detected Data	(
	Distinct Detected Data	6	Number of Non-Detect Data	<u>`</u>
			Percent Non-Detects	25.00%
Raw Stati	istics		Log-transformed Statistics	
. tav otati	Minimum Detected	60	Minimum Detected	4.094
	Maximum Detected	470	Maximum Detected	6.153
	Mean of Detected	210	Mean of Detected	5.151
	SD of Detected	143.8	SD of Detected	0.705
	Minimum Non-Detect	340	Minimum Non-Detect	5.829
	Maximum Non-Detect	710	Maximum Non-Detect	6.56
		7.0		0.000
Note: Data have multiple DLs - Use of K	M Method is recommen	nded	Number treated as Non-Detect	8
			Number treated as Detected	(
IFor all methods (except KM, DL/2, and F	NOO MEHIOUS),		Number mediculas Defected	
Observations < Largest ND are treated a	warning: Thereshould be noted that ev	en though b	Single DL Non-Detect Percentage  Detected Values in this data  ootstrap may be performed on this data set	100.00%
Note: It s	Warning: There should be noted that ever the resulting calculations	en though b may not be	Single DL Non-Detect Percentage  Detected Values in this data	100.00%
Observations < Largest ND are treated a  Note: It s	Warning: There should be noted that ever the resulting calculations	ven though be may not be	Single DL Non-Detect Percentage  Detected Values in this data cootstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.	100.00%
Observations < Largest ND are treated a  Note: It s  th	Warning: There should be noted that ever resulting calculations ded to have 10-15 or m	ren though be may not be nore distinct of UCL St.	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics	100.00%
Observations < Largest ND are treated a  Note: It s  th  It is recommendation  Normal Distribution Test with	Warning: There should be noted that ever resulting calculations ded to have 10-15 or many the Detected Values Only	ven though be may not be nore distinct of UCL St.	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On	ly
Observations < Largest ND are treated a  Note: It is the  It is recommendation Test with Shales in the second test of the secon	Warning: There should be noted that evice resulting calculations ded to have 10-15 or many the Detected Values Only piro Wilk Test Statistic	ven though be may not be more distinct of UCL Str. 0.903	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic	l <b>y</b> 0.99°
Observations < Largest ND are treated a  Note: It is the  It is recommendation Test with Shales in the second test of the secon	Warning: There should be noted that evice resulting calculations ded to have 10-15 or many between the transfer of the transfe	ven though be may not be nore distinct of UCL St.	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On	<b>ly</b> 0.991
Note: It is recommendate Normal Distribution Test with Shap 5% Shap Data appear Normal at 5%	Warning: There should be noted that ever resulting calculations ded to have 10-15 or many the Detected Values Only piro Wilk Test Statistic piro Wilk Critical Value of Significance Level	ven though be may not be more distinct of UCL Str. 0.903	Single DL Non-Detect Percentage  Detected Values in this data constrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level	l <b>y</b> 0.99°
Note: It is recommendate Normal Distribution Test with Shap 5% Shap Data appear Normal at 5% Assuming Normal	Warning: There should be noted that ever resulting calculations ded to have 10-15 or many highest piro Wilk Test Statistic piro Wilk Critical Value of Significance Level	ven though be may not be more distinct of UCL Str. 0.903	Single DL Non-Detect Percentage  Detected Values in this data constrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	<b>ly</b> 0.991
Note: It is recommendate Normal Distribution Test with Shap 5% Shap Data appear Normal at 5% Assuming Normal	Warning: There should be noted that ever resulting calculations ded to have 10-15 or much Detected Values Only piro Wilk Test Statistic piro Wilk Critical Value Significance Level  I Distribution  // Substitution Method	ven though be may not be may not be more distinct of the ucle St. v. 0.903 0.788	Single DL Non-Detect Percentage  Detected Values in this data constrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method	0.991 0.788
Note: It is recommendate Normal Distribution Test with Shap 5% Shap Data appear Normal at 5% Assuming Normal	Warning: There should be noted that ever resulting calculations and to have 10-15 or many the Detected Values Only piro Wilk Test Statistic piro Wilk Critical Value of Significance Level I Distribution (2 Substitution Method Mean	ven though be may not be may not be more distinct of UCL St. 0.903 0.788	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.99° 0.788
Note: It is recommendate Normal Distribution Test with Shap 5% Shap Data appear Normal at 5% Assuming Normal	Warning: There should be noted that ever resulting calculations and to have 10-15 or much be provided to hav	ven though be may not be may not be more distinct of UCL St. 0.903 0.788	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	0.99° 0.788 5.239 0.648
Note: It is recommendate Normal Distribution Test with Shap 5% Shap Data appear Normal at 5% Assuming Normal	Warning: There should be noted that ever resulting calculations and to have 10-15 or many the Detected Values Only piro Wilk Test Statistic piro Wilk Critical Value of Significance Level I Distribution (2 Substitution Method Mean	ven though be may not be may not be more distinct of UCL St. 0.903 0.788	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.99° 0.788 5.239 0.648
Note: It is recommendate the second of the s	Warning: There should be noted that ever resulting calculations and to have 10-15 or much be presented by the problem of the p	ucl stinct of UCL St. 0.903 0.788 223.1 133.4 312.5	Detected Values in this data constrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.99° 0.788 5.239 0.648
Note: It is recommendate the second of the s	Warning: There should be noted that ever resulting calculations and to have 10-15 or much be presented by the process of the p	ven though be may not be may not be more distinct of UCL St. 0.903 0.788	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	5.239 0.648 442.6
Note: It is recommendate the second of the s	Warning: There should be noted that ever resulting calculations and to have 10-15 or much be presented by the process of the p	ucl stinct of UCL St. 0.903 0.788 223.1 133.4 312.5	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale	5.239 0.648 442.6
Note: It is recommendate the Normal Distribution Test with Shale 5% Shape Data appear Normal at 5% Assuming Normal DL/	Warning: There should be noted that ever resulting calculations and to have 10-15 or much be presented by the process of the p	ucl stinct of UCL St. 0.903 0.788 223.1 133.4 312.5	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	5.239 0.648 442.6
Note: It is recommendate the Normal Distribution Test with Shale 5% Shape Data appear Normal at 5% Assuming Normal DL/	Warning: There should be noted that ever resulting calculations and to have 10-15 or much be presented by the process of the p	ucl stinct of UCL St. 0.903 0.788 223.1 133.4 312.5	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	5.239 0.648 442.6 5.12 0.599 195.8
Note: It is recommendate the second of the s	Warning: There should be noted that ever resulting calculations and to have 10-15 or much be presented by the process of the p	ucl stinct of UCL St. 0.903 0.788 223.1 133.4 312.5	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Coriginal Scale SD in Original Scale	5.239 0.648 442.6 5.12 0.599 195.8 124.5
Note: It is recommendate the second of the s	Warning: There should be noted that ever resulting calculations and to have 10-15 or much be presented by the process of the p	ucl stinct of UCL St. 0.903 0.788 223.1 133.4 312.5	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Criginal Scale SD in Original Scale SD in Original Scale	5.239 0.648 442.6 5.12 0.599 195.8 124.5 279.2
Note: It is recommendate the second of the s	Warning: There should be noted that ever resulting calculations and to have 10-15 or much be presented by the process of the p	ucl stinct of UCL St. 0.903 0.788 223.1 133.4 312.5	Single DL Non-Detect Percentage  Detected Values in this data cotstrap may be performed on this data set reliable enough to draw conclusions  observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Coriginal Scale SD in Original Scale	<b>ly</b> 0.991

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.46	Data appear Normal at 5% Significance Level	
Theta Star	143.8	Data appear Normal at 5% Orginicance Level	
nu star	17.52		
nu stai	17.52		
A-D Test Statistic	0.177	Nonparametric Statistics	
5% A-D Critical Value	0.702	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.702	Mean	202
5% K-S Critical Value	0.335	SD	125
Data appear Gamma Distributed at 5% Significance Lev	/el	SE of Mean	53.
		95% KM (t) UCL	303
Assuming Gamma Distribution		95% KM (z) UCL	290
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	304
Minimum	60	95% KM (bootstrap t) UCL	356
Maximum	470	95% KM (BCA) UCL	29
Mean	206.2	95% KM (Percentile Bootstrap) UCL	288
Median	188.9	95% KM (Chebyshev) UCL	434
SD	122.1	97.5% KM (Chebyshev) UCL	534
k star	2.281	99% KM (Chebyshev) UCL	73
Theta star	90.39		
Nu star	36.49	Potential UCLs to Use	
AppChi2	23.66	95% KM (t) UCL	303
95% Gamma Approximate UCL (Use when n >= 40)	317.9	95% KM (Percentile Bootstrap) UCL	288
95% Adjusted Gamma UCL (Use when n < 40)	356.7		
: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% L	JCL are prov	ided to help the user to select the most appropriate 95% UCL.	
		ation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight.	the user ma	y want to consult a statistician.	

	General S	Statistics	
Number of Valid Data	8	Number of Detected Data	(
Number of Distinct Detected Data	6	Number of Non-Detect Data	2
		Percent Non-Detects	25.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	50	Minimum Detected	3.912
Maximum Detected	410	Maximum Detected	6.01
Mean of Detected	190	Mean of Detected	5.05
SD of Detected	124.1	SD of Detected	0.71
Minimum Non-Detect	340	Minimum Non-Detect	5.82
Maximum Non-Detect	710	Maximum Non-Detect	6.56
		N. J. J. J. D. J. J.	
Note: Data have multiple DLs - Use of KM Method is recommend	aed	Number treated as Non-Detect	
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There	are only 6 [	Detected Values in this data	
		ootstrap may be performed on this data set	
		reliable enough to draw conclusions	
·			
		Toliable chagn to draw contractions	
It is recommended to have 10-15 or m	•	•	
It is recommended to have 10-15 or me	•	observations for accurate and meaningful results.	
It is recommended to have 10-15 or me	•	•	
	•	observations for accurate and meaningful results.	
Normal Distribution Test with Detected Values Only	uCL St	observations for accurate and meaningful results.  atistics  Lognormal Distribution Test with Detected Values Onl	
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	UCL St	atistics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic	0.96
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	uCL St	atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value	0.96
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	UCL St	atistics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic	0.96
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level	UCL St	atistics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	0.96
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level Assuming Normal Distribution	UCL St	atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value	0.96
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	UCL St 0.912 0.788	atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	0.96 0.78
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	UCL St 0.912 0.788	atistics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.96 0.78 5.16
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	UCL St 0.912 0.788	atistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	0.96 0.788 5.168 0.672
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL St 0.912 0.788 208.1 120.7 289	atistics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.96 0.78 0.78 5.16 0.67
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL St 0.912 0.788 208.1 120.7	atistics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.96 0.78 5.16 0.67 43
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL St 0.912 0.788 208.1 120.7 289	atistics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale	0.96 0.78 5.16 0.67 43
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL St 0.912 0.788 208.1 120.7 289	Assuming Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD  Satistics  Shapiro Wilk Pest Statistic  5% Shapiro Wilk Critical Value  Shapiro Wilk Critical Value  Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean in Log Scale  SD in Log Scale	0.96 0.78 5.16 0.67 43 5.02 0.61
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL St 0.912 0.788 208.1 120.7 289	Assuming Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale	5.16 0.67 43 5.02 0.61 177.
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL St 0.912 0.788 208.1 120.7 289	Assuming Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  SD in Original Scale  SD	5.16 0.67 43 5.02 0.61 177. 107.
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL St 0.912 0.788 208.1 120.7 289	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  95% t UCL	5.16 0.67 43 5.02 0.61 177. 249.
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL St 0.912 0.788 208.1 120.7 289	Assuming Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  95% t UCL  95% Percentile Bootstrap UCL	5.169 0.672 433 5.022 0.611 177.2 249.3
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL Maximum Likelihood Estimate(MLE) Method	UCL St 0.912 0.788 208.1 120.7 289	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  95% t UCL	5.165 0.672 433 5.022 0.611 177.2 107.6 249.3 237.4 252.4 330.7

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.473	Data appear Normal at 5% Significance Level	
Theta Star	129		
nu star	17.68		
A-D Test Statistic	0.238	Nonparametric Statistics	
5% A-D Critical Value	0.702	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.702	Mean	183
5% K-S Critical Value	0.335	SD	108
Data appear Gamma Distributed at 5% Significance Lev	/el	SE of Mean	46.
		95% KM (t) UCL	27
Assuming Gamma Distribution		95% KM (z) UCL	259
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	2
Minimum	50	95% KM (bootstrap t) UCL	288
Maximum	410	95% KM (BCA) UCL	25
Mean	186.7	95% KM (Percentile Bootstrap) UCL	2
Median	180.7	95% KM (Chebyshev) UCL	384
SD	105.3	97.5% KM (Chebyshev) UCL	47
k star	2.304	99% KM (Chebyshev) UCL	642
Theta star	81.04		
Nu star	36.87	Potential UCLs to Use	
AppChi2	23.97	95% KM (t) UCL	27
95% Gamma Approximate UCL (Use when n >= 40)	287.2	95% KM (Percentile Bootstrap) UCL	2
95% Adjusted Gamma UCL (Use when n < 40)	322.1		
: DL/2 is not a recommended method.	•		
Note: Suggestions regarding the selection of a 95% L	JCL are provi	ded to help the user to select the most appropriate 95% UCL.	
		ation studies summarized in Singh, Maichle, and Lee (2006).	
		want to consult a statistician.	

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	General S		
Number of Valid Data	8	Number of Detected Data	
Number of Distinct Detected Data	7	Number of Non-Detect Data	40.500
		Percent Non-Detects	12.50%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	56.5	Minimum Detected	4.03
Maximum Detected	660	Maximum Detected	6.49
Mean of Detected	271.8	Mean of Detected	5.27
SD of Detected	216.9	SD of Detected	0.9
Minimum Non-Detect	710	Minimum Non-Detect	6.56
Maximum Non-Detect	710	Maximum Non-Detect	6.56
Warning: There	e are only 7	Detected Values in this data	
		ootstrap may be performed on this data set	
the resulting calculations	may not be	reliable enough to draw conclusions	
It is recommended to have 10-15 or m	nore distinct	observations for accurate and meaningful results.	
	UCL St	atistics	
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	v
Shapiro Wilk Test Statistic	0.916	Shapiro Wilk Test Statistic	0.94
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.80
Data appear Normal at 5% Significance Level	0.000	Data appear Lognormal at 5% Significance Level	0.00
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	282.2	Mean	5.35
SD	203	SD	0.88
95% DL/2 (t) UCL	418.1	95% H-Stat (DL/2) UCL	898.
() ==		, , , , , , , , , , , , , , , , , , , ,	
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	5.27
		SD in Log Scale	0.86
		Mean in Original Scale	262.
		SD in Original Scale	202.
		95% t UCL	398
		95% Percentile Bootstrap UCL	377.
		95% BCA Bootstrap UCL	404.
		95% H-UCL	776.
Gamma Distribution Test with Detected Values Onl	v	Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.051	Data appear Normal at 5% Significance Level	
Theta Star	258.6	_ and appeara. a. o o.ga.	
nu star	14.72		
A-D Test Statistic	0.226	Nonparametric Statistics	
5% A-D Critical Value	0.719	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.719	Mean	271.
5% K-S Critical Value	0.316	SD	200.
Data appear Gamma Distributed at 5% Significance Lo	evel	SE of Mean	81.9
		95% KM (t) UCL	427.
Assuming Gamma Distribution		95% KM (z) UCL	406.
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	428.
Minimum	56.5	95% KM (bootstrap t) UCL	483.
Maximum	660	95% KM (BCA) UCL	410.
Mean	271.7	95% KM (Percentile Bootstrap) UCL	398.
Median	250.4	95% KM (Chebyshev) UCL	629.
SD	200.8	97.5% KM (Chebyshev) UCL	783.
k star	1.267	99% KM (Chebyshev) UCL	108
Theta star	214.5	Potential LICLs to Lies	
Nu star	20.27 11.05	Potential UCLs to Use 95% KM (t) UCL	107
AppChi2 95% Gamma Approximate UCL (Use when n >= 40)	498.4	95% KM (Percentile Bootstrap) UCL	427. 398.
95% Adjusted Gamma UCL (Use when n < 40)	587.3	35 /6 KIVI (Percentile bootstrap) OCL	398.
	567.3		
te: DI /2 is not a recommended method			
	UCL are nro	vided to help the user to select the most appropriate 95% LICL	
		vided to help the user to select the most appropriate 95% UCL.  ulation studies summarized in Singh, Maichle, and Lee (2006).	

	General		
Number of Valid Data	8	Number of Detected Data	
Number of Distinct Detected Data	7	Number of Non-Detect Data	
		Percent Non-Detects	12.5
Raw Statistics		Log-transformed Statistics	
Minimum Detected	41	Minimum Detected	3.
Maximum Detected	580	Maximum Detected	6.
Mean of Detected	229.6	Mean of Detected	
SD of Detected	189	SD of Detected	1
Minimum Non-Detect	710	Minimum Non-Detect	6
Maximum Non-Detect	710	Maximum Non-Detect	6
Warning: There	are only 7 I	Detected Values in this data	
		ootstrap may be performed on this data set	
the resulting calculations	may not be	reliable enough to draw conclusions	
It is recommended to have 10-15 or m	ore distinct	observations for accurate and meaningful results.	
	UCL St		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.903	Shapiro Wilk Test Statistic	0
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	C
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	245.3	Mean	5
SD OF (CD) (2 (4) HOL	180.5	SD SD	C
95% DL/2 (t) UCL	366.1	95% H-Stat (DL/2) UCL	
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly	IN//A	Mean in Log Scale	
inia medica falled to converge property		SD in Log Scale	C
		Mean in Original Scale	2
		SD in Original Scale	1
		95% t UCL	3
		95% Percentile Bootstrap UCL	3
		95% BCA Bootstrap UCL	3
		95% H-UCL	7
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.959	Data appear Normal at 5% Significance Level	
Theta Star	239.3		
nu star	13.43		
A-D Test Statistic	0.284	Nonparametric Statistics	
5% A-D Critical Value	0.721	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.721	Mean	2
5% K-S Critical Value	0.317	SD SE of Mean	7
Data appear Gamma Distributed at 5% Significance Le	evei	95% KM (t) UCL	3
Assuming Gamma Distribution		95% KM (z) UCL	3
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	3
Minimum	41	95% KM (bootstrap t) UCL	
Maximum	580	95% KM (BCA) UCL	3
Mean	229	95% KM (Percentile Bootstrap) UCL	3
Median	222.5	95% KM (Chebyshev) UCL	5
SD	175	97.5% KM (Chebyshev) UCL	6
k star	1.152	99% KM (Chebyshev) UCL	g
Theta star	198.8		
Nu star	18.43	Potential UCLs to Use	
	9.702	95% KM (t) UCL	
AppChi2		95% KM (Percentile Bootstrap) UCL	3
AppChi2 95% Gamma Approximate UCL (Use when n >= 40)	435	` '	
AppChi2 95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	435 517.8		
AppChi2 95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  DL/2 is not a recommended method.	517.8	ovided to help the user to select the most appropriate 95% UCL.	

	General Statistics		
Number of Valid Data	7	Number of Detected Data	
Number of Distinct Detected Data	1	Number of Non-Detect Data	
Number of Missing Values	1	Percent Non-Detects	85.71
	and by the Drainet To	am to estimate environmental parameters (e.g. EDC	BT\/\
It is suggested to use alternative site specific values determi	ned by the Project re	ani to estimate environmental parameters (e.g., Er o,	, DIV <i>)</i> .

INDENO(1,2,3-CD)PYRENE			
	General Statis	stics	
Number of Valid Data	8	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	4
		Percent Non-Detects	50.00%
Raw Statistics		Log transferment Chatistics	
Minimum Detected	48	Log-transformed Statistics  Minimum Detected	3.871
Maximum Detected	190	Maximum Detected	5.247
Mean of Detected	117	Mean of Detected	4.628
SD of Detected	64.67	SD of Detected	0.623
Minimum Non-Detect	340	Minimum Non-Detect	5.829
Maximum Non-Detect	1700	Maximum Non-Detect	7.438
ا Note: Data have multiple DLs - Use of KM Method is recommen	ded	Number treated as Non-Detect	3
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	(
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
		Detected Values in this data	
		trap may be performed on this data set	
	move not be relie	ble enough to draw conclusions	
· · · · · · · · · · · · · · · · · · ·	•	ervations for accurate and meaningful results.	
· · · · · · · · · · · · · · · · · · ·	ore distinct obse	ervations for accurate and meaningful results.	
It is recommended to have 10-15 or mo	•	ervations for accurate and meaningful results.	lv
It is recommended to have 10-15 or more and the second sec	ore distinct obse	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl	
It is recommended to have 10-15 or more and the second sec	UCL Statisti	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl  Shapiro Wilk Test Statistic	0.95
It is recommended to have 10-15 or more and the second sec	ore distinct obse	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.95
It is recommended to have 10-15 or monomer of the Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level	UCL Statisti	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	l <b>y</b> 0.95 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level Assuming Normal Distribution	UCL Statisti	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.95
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	UCL Statisti 0.952 0.748	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method	0.95 0.748
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	UCL Statisti 0.952 0.748	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.95 0.748 5.179
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	UCL Statisti 0.952 0.748	ervations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD	0.95 0.748 5.179 0.871
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean	UCL Statisti 0.952 0.748	ervations for accurate and meaningful results.  ics  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.95 0.748 5.179 0.871
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Statisti 0.952 0.748  252.3 258.1 425.1	ervations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.95 0.748 5.179 0.871
It is recommended to have 10-15 or more support of the commended to have 10-15 or more support of the commended to have 10-15 or more support of the commended to have 10-15 or more support of the commended support of the	UCL Statisti 0.952 0.748 252.3 258.1	ervations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.95 0.748 5.179 0.871 723.6
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Statisti 0.952 0.748  252.3 258.1 425.1	ervations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale	0.95 0.748 5.179 0.871 723.6
It is recommended to have 10-15 or more and the second of	UCL Statisti 0.952 0.748  252.3 258.1 425.1	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD	0.95 0.748 5.179 0.871 723.6 4.628 0.408
It is recommended to have 10-15 or more and the second of	UCL Statisti 0.952 0.748  252.3 258.1 425.1	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale	0.95 0.748 5.179 0.871 723.6 4.628 0.408 109.6
It is recommended to have 10-15 or more support of the commended to have 10-15 or more support of the commended to have 10-15 or more support of the commended to have 10-15 or more support of the commended support of the	UCL Statisti 0.952 0.748  252.3 258.1 425.1	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale	5.179 0.871 723.6 4.628 0.408 109.6 43.06
It is recommended to have 10-15 or more support of the commended to have 10-15 or more support of the commended to have 10-15 or more support of the commended to have 10-15 or more support of the commended support of the	UCL Statisti 0.952 0.748  252.3 258.1 425.1	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale  95% t UCL	5.179 0.871 723.6 4.628 0.408 109.6 43.06
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.952 0.748  252.3 258.1 425.1	Assuming Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  SD in Original Scale  95% t UCL  95% Percentile Bootstrap UCL	5.179 0.871 723.6 4.628 0.408 109.6 43.06 138.5
Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	UCL Statisti 0.952 0.748  252.3 258.1 425.1	Assuming Lognormal Distribution  Assuming Lognormal Distribution  Data appear Lognormal Distribution  DL/2 Substitution Method  Mean  SD  95% H-Stat (DL/2) UCL  Log ROS Method  Mean in Log Scale  SD in Log Scale  Mean in Original Scale  SD in Original Scale  95% t UCL	0.95 0.748 5.179

INDENO(1,2,3-CD)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only	1	Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.136	Data appear Normal at 5% Significance Level	
Theta Star	103		
nu star	9.089		
A-D Test Statistic	0.273	Nonparametric Statistics	
5% A-D Critical Value	0.659	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.659	Mean	11
5% K-S Critical Value	0.396	SD	56.0
Data appear Gamma Distributed at 5% Significance Le	vel	SE of Mean	32.3
		95% KM (t) UCL	178.3
Assuming Gamma Distribution		95% KM (z) UCL	170.2
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	183.
Minimum	48	95% KM (bootstrap t) UCL	185.
Maximum	190	95% KM (BCA) UCL	170
Mean	117.3	95% KM (Percentile Bootstrap) UCL	170
Median	117.5	95% KM (Chebyshev) UCL	258
SD	42.34	97.5% KM (Chebyshev) UCL	318.9
k star	4.833	99% KM (Chebyshev) UCL	438.
Theta star	24.26		
Nu star	77.33	Potential UCLs to Use	
AppChi2	58.08	95% KM (t) UCL	178.3
95% Gamma Approximate UCL (Use when n >= 40)	156.2	95% KM (Percentile Bootstrap) UCL	170
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL.	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insight	t, the user m	ay want to consult a statistician.	

	General	Statistics	
Number of Valid Observations		Number of Distinct Observations	7
Number of Missing Values			
Raw Statistics		Log-transformed Statistics	
Minimum	3810	Minimum of Log Data	8.24
Maximum		Maximum of Log Data	
Mean	7361	Mean of log Data	
Geometric Mean		SD of log Data	
Median			
	3012		
Std. Error of Mean	1139		
Coefficient of Variation	0.409		
Skewness	0.254		
It is suggested to collect at lea	st 8 to 10 ob	o compute meaningful and reliable test statistics and estimates!  pservations using these statistical methods!	
		ves (DQO) based sample size and analytical results.	
	_	. =	
		nly 7 Values in this data	
		strap methods may be performed on this data set,	
the resulting calculations	s may not be	e reliable enough to draw conclusions	
The literature suggests to use bootstra	ap methods	on data sets having more than 10-15 observations.	
	Dalamantik	Ol O4-41-41	
Normal Distribution Tool	Relevant U	CL Statistics	
Normal Distribution Test	0.074	Lognormal Distribution Test	0.00
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.80
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
A 1 N 150 N 1			
Assuming Normal Distribution	I	Assuming Lognormal Distribution	
95% Student's-t UCL	9573	95% H-UCL	
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	125
95% Adjusted-CLT UCL (Chen-1995)		97.5% Chebyshev (MVUE) UCL	147
		97.5% Chebyshev (MVUE) UCL 99% Chebyshev (MVUE) UCL	147
95% Adjusted-CLT UCL (Chen-1995)		97.5% Chebyshev (MVUE) UCL 99% Chebyshev (MVUE) UCL	147
95% Adjusted-CLT UCL (Chen-1995)		97.5% Chebyshev (MVUE) UCL 99% Chebyshev (MVUE) UCL Data Distribution	147
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)	9591	99% Chebyshev (MVUE) UCL	147
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978) Gamma Distribution Test	9591 3.978	99% Chebyshev (MVUE) UCL  Data Distribution	147
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test k star (bias corrected)	3.978 1850	99% Chebyshev (MVUE) UCL  Data Distribution	147
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected)  Theta Star  MLE of Mean	3.978 1850 7361	99% Chebyshev (MVUE) UCL  Data Distribution	147
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected)  Theta Star  MLE of Mean  MLE of Standard Deviation	3.978 1850 7361 3690	99% Chebyshev (MVUE) UCL  Data Distribution	147
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected)  Theta Star  MLE of Mean  MLE of Standard Deviation nu star	3.978 1850 7361 3690 55.69	99% Chebyshev (MVUE) UCL  Data Distribution  Data appear Normal at 5% Significance Level	147
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05)	3.978 1850 7361 3690 55.69 39.54	99% Chebyshev (MVUE) UCL  Data Distribution  Data appear Normal at 5% Significance Level  Nonparametric Statistics	147
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance	3.978 1850 7361 3690 55.69 39.54 0.0158	99% Chebyshev (MVUE) UCL  Data Distribution  Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL	923
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05)	3.978 1850 7361 3690 55.69 39.54 0.0158	99% Chebyshev (MVUE) UCL  Data Distribution  Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL	9233 9573
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47	99% Chebyshev (MVUE) UCL  Data Distribution  Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL	923 957 906
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47	99% Chebyshev (MVUE) UCL  Data Distribution  Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL  95% Bootstrap-t UCL	9233 9573 9060 9783
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47 0.476 0.709	99% Chebyshev (MVUE) UCL  Data Distribution  Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL  95% Jackknife UCL  95% Standard Bootstrap UCL  95% Bootstrap-t UCL  95% Hall's Bootstrap UCL	9233 9573 9066 9783 8666
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47 0.476 0.709 0.262	Pata Distribution Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	9233 957- 906 978. 866 910
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov 5% Critical Value	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47 0.476 0.709 0.262 0.313	Pata Distribution Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	923 957 906 978 866 910 913
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47 0.476 0.709 0.262 0.313	Data Distribution Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	923 957 906 978 866 910 913 123
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47 0.476 0.709 0.262 0.313	Data Distribution Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL	923 957 906 978 866 910 913 123 144
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47 0.476 0.709 0.262 0.313	Data Distribution Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	923 957 906 978 866 910 913 123 144
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47 0.476 0.709 0.262 0.313 evel	Data Distribution Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL	923 957 906 978 866 910 913 123
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47 0.476 0.709 0.262 0.313 evel	Data Distribution Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL	923 957 906 978 866 910 913 123
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47 0.476 0.709 0.262 0.313 evel	Data Distribution Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	923 957 906 978 866 910 913 123 144 186
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47 0.476 0.709 0.262 0.313 evel	Data Distribution Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL	923 957 906 978 866 910 913 123 144 186
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)  Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	3.978 1850 7361 3690 55.69 39.54 0.0158 35.47 0.476 0.709 0.262 0.313 evel	Data Distribution Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	9233 9573 9066 9788 8666 9103 1233 1444 1866

BERYLLIUM			
	General S	Statistics	
Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
Number of Distinct Detected Data  Number of Missing Values	1	Percent Non-Detects	14.29%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.18	Minimum Detected	-1.715
Maximum Detected	3.5	Maximum Detected	1.253
Mean of Detected	0.863	Mean of Detected	-0.771
SD of Detected	1.299	SD of Detected	1.072
Minimum Non-Detect	0.2	Minimum Non-Detect	-1.609
Maximum Non-Detect	0.2	Maximum Non-Detect	-1.609
Maria Time		State IV. Land St. Land	
		etected Values in this data	
		potstrap may be performed on this data set	
the resulting calculations	s may not be	reliable enough to draw conclusions	
111			
It is recommended to have 10-15 or n	nore distinct c	observations for accurate and meaningful results.	
	LIOI CH	al-al-a	
Normal Distribution Test with Detected Values Only	UCL Sta	Lognormal Distribution Test with Detected Values On	h,
Shapiro Wilk Test Statistic	0.593	Shapiro Wilk Test Statistic	0.835
5% Shapiro Wilk Critical Value	0.393	5% Shapiro Wilk Critical Value	0.833
Data not Normal at 5% Significance Level	0.766	Data appear Lognormal at 5% Significance Level	0.700
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.754	Mean	-0.99
SD	1.22	SD	1.137
95% DL/2 (t) UCL	1.65	95% H-Stat (DL/2) UCL	4.74
33 % DE12 (t) GGE	1.00	33% TI-Otat ( <i>DEI2</i> ) 66E	7.77
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.476	Mean in Log Scale	-0.981
SD	1.412	SD in Log Scale	1.125
95% MLE (t) UCL	1.513	Mean in Original Scale	0.755
95% MLE (f) OCL	1.545	SD in Original Scale	1.22
95 % WILE (TIKU) OCL	1.545	95% t UCL	1.65
		95% Percentile Bootstrap UCL	1.641
		95% BCA Bootstrap UCL	2.073
		95 % BCA BOOISHAP OCL	4.544
		90% N UCL	4.544

BERYLLIUM (Continued)			
Gamma Distribution Test with Detected Values Onl	y	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.578	Data appear Lognormal at 5% Significance Level	
Theta Star	1.493		
nu star	6.934		
A-D Test Statistic	0.831	Nonparametric Statistics	
5% A-D Critical Value	0.717	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.717	Mean	0.765
5% K-S Critical Value	0.342	SD	1.124
Data not Gamma Distributed at 5% Significance Lev	el	SE of Mean	0.465
		95% KM (t) UCL	1.669
Assuming Gamma Distribution		95% KM (z) UCL	1.53
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.653
Minimum	0.000001	95% KM (bootstrap t) UCL	7.397
Maximum	3.5	95% KM (BCA) UCL	1.676
Mean	0.739	95% KM (Percentile Bootstrap) UCL	1.646
Median	0.29	95% KM (Chebyshev) UCL	2.793
SD	1.23	97.5% KM (Chebyshev) UCL	3.67
k star	0.264	99% KM (Chebyshev) UCL	5.394
Theta star	2.795		
Nu star	3.703	Potential UCLs to Use	
AppChi2	0.608	97.5% KM (Chebyshev) UCL	3.67
95% Gamma Approximate UCL (Use when n >= 40)	4.503		
95% Adjusted Gamma UCL (Use when n < 40)	8.355		
	nded UCL ex	ceeds the maximum observation	
Note: DL/2 is not a recommended method.			
		ovided to help the user to select the most appropriate 95% UCL	
		ulation studies summarized in Singh, Maichle, and Lee (2006).	
For additional insigh	t, the user m	ay want to consult a statistician.	

CADMIUM			
	Seneral Sta	ntiation	
	aerierai Sia	ausucs	
Number of Valid Data	8	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	7
		Percent Non-Detects	87.50%
Warning: Only one distinct data value was detected! P	roUCL (or	any other software) should not be used on such a data set!	
It is suggested to use alternative site specific values determined			BTV).
The data set for varia	able CADN	MIUM was not processed!	

	0 11101 01 11 11	. = "5 .	
Llass Calastad Ontion	General UCL Statistics f	or Full Data	Sets
User Selected Option		-\	ava alutani Duati Final Diak Assassmant EDCs Confess Cail Duildian 224 ula
From File Full Precision		sinewportio	erecktor\Draft Final Risk Assessment\EPCs\Surface Soil - Building 234.xls.v
Confidence Coefficient	OFF 95%		
	2000		
Number of Bootstrap Operations	2000		
ALUMINUM			
		General	Statistics
Nun	nber of Valid Observations		Number of Distinct Observations 7
	Number of Missing Values		Number of District Observations 7
	Number of Missing Values	11	
Raw	Statistics		Log-transformed Statistics
1.00	Minimum	3810	Minimum of Log Data 8.245
	Maximum		Maximum of Log Data 9.333
	Mean		Mean of log Data 8.829
	Geometric Mean		SD of log Data 0.424
	Median		02 0.109 2 0.12 1
		3012	
	Std. Error of Mean		
	Coefficient of Variation		
	Skewness		
It is	suggested to collect at lea	ast 8 to 10 ol	o compute meaningful and reliable test statistics and estimates!  oservations using these statistical methods!  ives (DQO) based sample size and analytical results.
Note: It s			nly 7 Values in this data strap methods may be performed on this data set,
			e reliable enough to draw conclusions
The literatu	re suggests to use bootstr	ap methods	on data sets having more than 10-15 observations.
			·
Name of Di-	stribution Test	Relevant U	CL Statistics
		0.974	Lognormal Distribution Test
	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value		Shapiro Wilk Test Statistic 0.899 Shapiro Wilk Critical Value 0.803
	snapiro Wilk Critical Value at 5% Significance Level	U.0U3	Data appear Lognormal at 5% Significance Level
Data appear Norman	at 5 % Significance Level		Data appear Lognormal at 5% Significance Level
Accuming No	rmal Distribution		Assuming Lognormal Distribution
Assuming No	95% Student's-t UCL	0573	95% H-UCL 11151
	33 % Student S-t UCL	33/3	
UEO/ 1101 - /44:	uotod for Ckoumana		()b0/ (babyabay /M/// II \ I I/) (400.00
95% UCLs (Adj	usted for Skewness)	0350	95% Chebyshev (MVUE) UCL 12535
95% Adjus	usted for Skewness) ed-CLT UCL (Chen-1995) ied-t UCL (Johnson-1978)		95% Chebyshev (MVUE) UCL 12535 97.5% Chebyshev (MVUE) UCL 14771 99% Chebyshev (MVUE) UCL 19163

Gamma Distribution Test		Data Distribution
k star (bias corrected)	3.978	Data appear Normal at 5% Significance Level
Theta Sta		.,
MLE of Mear	7361	
MLE of Standard Deviation	3690	
nu sta	55.69	
Approximate Chi Square Value (.05)	39.54	Nonparametric Statistics
Adjusted Level of Significance	0.0158	95% CLT UCL 9233
Adjusted Chi Square Value	35.47	95% Jackknife UCL 9573
		95% Standard Bootstrap UCL 9097
Anderson-Darling Test Statistic	0.476	95% Bootstrap-t UCL 9756
Anderson-Darling 5% Critical Value	0.709	95% Hall's Bootstrap UCL 8676
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 9121
Kolmogorov-Smirnov 5% Critical Value	0.313	95% BCA Bootstrap UCL 9294
Data appear Gamma Distributed at 5% Significance I	_evel	95% Chebyshev(Mean, Sd) UCL 1232
		97.5% Chebyshev(Mean, Sd) UCL 1447
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 1868
95% Approximate Gamma UCL (Use when n >= 40)	10367	
95% Adjusted Gamma UCL (Use when n < 40)	11556	
Potential UCL to Use		Use 95% Student's-t UCL 9573
Note: Cugaretions regarding the colories of a OEO	/ LICL are n	resided to be the uses to releat the most energy site OFW LICH
		rovided to help the user to select the most appropriate 95% UCL. imulation studies summarized in Singh, Singh, and laci (2002)

	General	Statistics	
Number of Valid Observations		Number of Distinct Observations	8
Raw Statistics	I	Log-transformed Statistics	
Minimum		Minimum of Log Data	0.956
Maximum		Maximum of Log Data	
	11.19	Mean of log Data	
Geometric Mean		SD of log Data	18.0
Median SD	7.835		
Std. Error of Mean			
Coefficient of Variation			
Skewness			
		nly 8 Values in this data strap methods may be performed on this data set,	
		e reliable enough to draw conclusions	
	-		
The literature suggests to use bootstra	ap methods	on data sets having more than 10-15 observations.	
	Relevant U	CL Statistics	
Normal Distribution Test	7101014111	Lognormal Distribution Test	
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical Value	0.818	Shapiro Wilk Critical Value	0.818
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	16 44	95% H-UCL	20 80
95% UCLs (Adjusted for Skewness)	10.44	95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)	16 24	97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL	
30% Modified 1 302 (30/1/30/1 1970)	10.02	33% Gliebyshev (MVGE) GGE	11.00
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.379	Data appear Normal at 5% Significance Level	
Theta Star			
MLE of Mean			
MLE of Standard Deviation			
nu star	22.07		
Approximate Chi Square Value (.05)	12.39	Nonparametric Statistics	
Adjusted Level of Significance	0.0195	95% CLT UCL	15.75
Adjusted Chi Square Value		95% Jackknife UCL	
		95% Standard Bootstrap UCL	15.45
Anderson-Darling Test Statistic		95% Bootstrap-t UCL	
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL	
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL	15.64
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL	
Data appear Gamma Distributed at 5% Significance L	evel	95% Chebyshev(Mean, Sd) UCL	
		97.5% Chebyshev(Mean, Sd) UCL	
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	38.76
95% Approximate Gamma UCL (Use when n >= 40)			
95% Adjusted Gamma UCL (Use when n < 40)	23.3		
Potential UCL to Use		Use 95% Student's-t UCL	16.44
Note: Suggestions regarding the selection of a 95%	UCI are nr	ovided to help the user to select the most appropriate 95% UCI	
		mulation studies summarized in Singh, Singh, and laci (2002)	
mood recommendations are based upon the res	additional in	a.a.a otaaloo oanimanzoa in onigii, oliigii, alia laci (2002)	

	General S	Statistics		
Number of Valid Observations			Number of Distinct Observations	7
				•
Raw Statistics			Log-transformed Statistics	
Minimum			Minimum of Log Data	
Maximum			Maximum of Log Data	
	2.105		Mean of log Data	
Geometric Mean			SD of log Data	1.123
Median				
	4.402			
Std. Error of Mean				
Coefficient of Variation				
Skewness	2.828			
Warning: Note: It should be noted that even t		ly 8 Values in this drap methods may b		
the resulting calculation	s may not be	reliable enough to	draw conclusions	
The literature suggests to use bootstra	•		more than 10-15 observations.	
Normal Distribution Test	Relevant UC	CL Statistics	Logrammal Distribution Toot	
Shapiro Wilk Test Statistic	0.427		Lognormal Distribution Test Shapiro Wilk Test Statistic	0 402
Shapiro Wilk Critical Value			Shapiro Wilk Test Statistic	
Data not Normal at 5% Significance Level	0.010	Data	not Lognormal at 5% Significance Level	0.010
Data not Normal at 5% Significance Level		Data	not Lognormal at 5% Significance Level	
Assuming Normal Distribution			Assuming Lognormal Distribution	
95% Student's-t UCL	5.054		95% H-UCL	7 444
95% UCLs (Adjusted for Skewness)	3.034		95% Chebyshev (MVUE) UCL	
95% Adjusted for Skewness) 95% Adjusted-CLT UCL (Chen-1995)	6 328		97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)			99% Chebyshev (MVUE) UCL	
	0.0.0		00% 00250 ( 02.)	0.000
Gamma Distribution Test			Data Distribution	
k star (bias corrected)	0.485	Data do	not follow a Discernable Distribution (0.05	5)
Theta Star	4.339		,	
MLE of Mean	2.105			
MLE of Standard Deviation	3.022			
nu star	7.762			
Approximate Chi Square Value (.05)			Nonparametric Statistics	
Adjusted Level of Significance	0.0195		95% CLT UCL	4.665
Adjusted Chi Square Value	1.906		95% Jackknife UCL	
			95% Standard Bootstrap UCL	
Anderson-Darling Test Statistic			95% Bootstrap-t UCL	
Anderson-Darling 5% Critical Value			95% Hall's Bootstrap UCL	
Kolmogorov-Smirnov Test Statistic			95% Percentile Bootstrap UCL	
Kolmogorov-Smirnov 5% Critical Value			95% BCA Bootstrap UCL	
Data not Gamma Distributed at 5% Significance Lev	/el		95% Chebyshev(Mean, Sd) UCL	
			97.5% Chebyshev(Mean, Sd) UCL	
Assuming Gamma Distribution	0.000		99% Chebyshev(Mean, Sd) UCL	17.59
95% Approximate Gamma UCL (Use when n >= 40)				
95% Adjusted Gamma UCL (Use when n < 40)	8.5/1			
Potential UCL to Use			Use 95% Hall's Bootstrap UCL	157
	UCI exceed	s the maximum obs		107
				JCL
In Case Bootstrap t and/or Hall's Bootstrap yields an	Ť			1
In Case Bootstrap t and/or Hall's Bootstrap yields an		11.11.1.1.1		
	UCL are pro			L.

	General	Statistics	
Number of Valid Observations		Number of Distinct Observations	7
Number of Missing Values			
Raw Statistics		Log-transformed Statistics	
Minimum	3.3	Minimum of Log Data	1 19
Maximum		Maximum of Log Data	
	11.82	Mean of log Data	
Geometric Mean		SD of log Data	
Median		02 01 log 2 d.a	0.72
	8.065		
Std. Error of Mean			
Coefficient of Variation			
Skewness	0.714		
It is suggested to collect at lea	ast 8 to 10 ob	compute meaningful and reliable test statistics and estimates!	]
If possible compute and collect Data Qu	uality Objectiv	ves (DQO) based sample size and analytical results.	
Warning:	There are or	nly 7 Values in this data	
		trap methods may be performed on this data set,	
		reliable enough to draw conclusions	
v			
The literature suggests to use bootstr	ap methods o	on data sets having more than 10-15 observations.	
***************************************	- р		
	Relevant U	CL Statistics	
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.886	Shapiro Wilk Test Statistic	0.95
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	1
		1. 9	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	17.75	95% H-UCL	30.0
95% UCLs (Adjusted for Skewness)	•	95% Chebyshev (MVUE) UCL	26.2
95% Adjusted-CLT UCL (Chen-1995)	17.71	97.5% Chebyshev (MVUE) UCL	32.4
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL	44.6
,			
Gamma Distribution Test		Data Distribution	
,	1.505	Data Distribution Data appear Normal at 5% Significance Level	
Gamma Distribution Test			
Gamma Distribution Test k star (bias corrected)	7.855		
Gamma Distribution Test k star (bias corrected) Theta Star	7.855 11.82		
Gamma Distribution Test  k star (bias corrected)  Theta Star  MLE of Mean  MLE of Standard Deviation  nu star	7.855 11.82 9.636 21.07		
Gamma Distribution Test  k star (bias corrected)  Theta Star  MLE of Mean  MLE of Standard Deviation  nu star	7.855 11.82 9.636 21.07	Data appear Normal at 5% Significance Level	
Gamma Distribution Test  k star (bias corrected)  Theta Star  MLE of Mean  MLE of Standard Deviation  nu star  Approximate Chi Square Value (.05)	7.855 11.82 9.636 21.07 11.64		16.8
Gamma Distribution Test  k star (bias corrected)  Theta Star  MLE of Mean  MLE of Standard Deviation  nu star  Approximate Chi Square Value (.05)  Adjusted Level of Significance	7.855 11.82 9.636 21.07 11.64 0.0158	Data appear Normal at 5% Significance Level  Nonparametric Statistics  95% CLT UCL	
Gamma Distribution Test  k star (bias corrected)  Theta Star  MLE of Mean  MLE of Standard Deviation  nu star  Approximate Chi Square Value (.05)	7.855 11.82 9.636 21.07 11.64 0.0158	Nonparametric Statistics 95% CLT UCL 95% Jackknife UCL	17.7
Gamma Distribution Test  k star (bias corrected)  Theta Star  MLE of Mean  MLE of Standard Deviation  nu star  Approximate Chi Square Value (.05)  Adjusted Level of Significance  Adjusted Chi Square Value	7.855 11.82 9.636 21.07 11.64 0.0158 9.6	Nonparametric Statistics 95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL	17.7 16.4
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	7.855 11.82 9.636 21.07 11.64 0.0158 9.6	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL	17.7 16.4 22.7
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	7.855 11.82 9.636 21.07 11.64 0.0158 9.6 0.28 0.714	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL	17.7 16.4 22.7 19.7
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	7.855 11.82 9.636 21.07 11.64 0.0158 9.6 0.28 0.714 0.195	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	17.7 16.4 22.7 19.7 16.6
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	7.855 11.82 9.636 21.07 11.64 0.0158 9.6 0.28 0.714 0.195 0.314	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	17.7 16.4 22.7 19.7 16.6 17.2
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	7.855 11.82 9.636 21.07 11.64 0.0158 9.6 0.28 0.714 0.195 0.314	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	17.7 16.4 22.7 19.7 16.6 17.2 25.1
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	7.855 11.82 9.636 21.07 11.64 0.0158 9.6 0.28 0.714 0.195 0.314	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	17.7 16.4 22.7 19.7 16.6 17.2 25.1 30.8
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	7.855 11.82 9.636 21.07 11.64 0.0158 9.6 0.28 0.714 0.195 0.314	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	17.7 16.4 22.7 19.7 16.6 17.2 25.1 30.8
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	7.855 11.82 9.636 21.07 11.64 0.0158 9.6 0.28 0.714 0.195 0.314 evel	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	17.7 16.4 22.7 19.7 16.6 17.2 25.1 30.8
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	7.855 11.82 9.636 21.07 11.64 0.0158 9.6 0.28 0.714 0.195 0.314 evel	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	17.7 16.4 22.7 19.7 16.6 17.2 25.1 30.8
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	7.855 11.82 9.636 21.07 11.64 0.0158 9.6 0.28 0.714 0.195 0.314 evel	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL	17.7 16.4 22.7 19.7 16.6 17.2 25.1 30.8 42.1
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	7.855 11.82 9.636 21.07 11.64 0.0158 9.6 0.28 0.714 0.195 0.314 evel	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Bootstrap UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	17.7 16.4 22.7 19.7 16.6 17.2 25.1 30.8 42.1
Gamma Distribution Test  k star (bias corrected) Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	7.855 11.82 9.636 21.07 11.64 0.0158 9.6 0.28 0.714 0.195 0.314 evel	Nonparametric Statistics  95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL	17.7 16.4 22.7 19.7 16.6 17.2 25.1 30.8 42.1

		Statistics	
Number of Valid Observations		Number of Distinct Observations	7
Number of Missing Values	1		
Raw Statistics		Log-transformed Statistics	
Minimum	7770	Minimum of Log Data	8.95
Maximum		Maximum of Log Data	
	22324	Mean of log Data	
Geometric Mean	19962	SD of log Data	
Median	20300		
	10479		
Std. Error of Mean			
Coefficient of Variation			
Skewness	0.168		
Warning: A sample size of 'n' = 7 may not adequa	te enough to	compute meaningful and reliable test statistics and estimates!	
		oservations using these statistical methods!	
If possible compute and collect Data Qu	ality Objecti	ves (DQO) based sample size and analytical results.	
Warning:	There are or	nly 7 Values in this data	
Note: It should be noted that even t	hough boots	strap methods may be performed on this data set,	
the resulting calculation	s may not be	e reliable enough to draw conclusions	
The literature suggests to use bootstra	ap methods	on data sets having more than 10-15 observations.	
	<u> </u>		
Name of Distribution Tool	Relevant U	CL Statistics	
Normal Distribution Test	0.074	Lognormal Distribution Test	0.05
Shapiro Wilk Critical Value		Shapiro Wilk Test Statistic Shapiro Wilk Critical Value	
Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Level	0.803	Data appear Lognormal at 5% Significance Level	0.80
Data appear Normal at 5% Significance Level		Data appear Lognorniar at 5% Significance Lever	
Assuming Normal Distribution 95% Student's-t UCL	30021	Assuming Lognormal Distribution 95% H-UCL	4038
95% UCLs (Adjusted for Skewness)	10021	95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)	29108	97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)	30062	99% Chebyshev (MVUE) UCL	
10.00		55.6 5.65,5.65 (, 62) 652	
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.741	Data appear Normal at 5% Significance Level	
Theta Star			
MLE of Mean			
MLE of Standard Deviation			
	38 38		
nu star		Nonparametric Statistics	
nu star Approximate Chi Square Value (.05)	25.19		0000
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance	25.19 0.0158	95% CLT UCL	
nu star Approximate Chi Square Value (.05)	25.19 0.0158	95% CLT UCL 95% Jackknife UCL	3002
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	25.19 0.0158 22.02	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL	3002 2834
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	25.19 0.0158 22.02 0.186	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL	3002 2834 3092
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	25.19 0.0158 22.02 0.186 0.71	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL	3002 2834 3092 2931
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	25.19 0.0158 22.02 0.186 0.71 0.138	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	3002 2834 3092 2931 2837
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	25.19 0.0158 22.02 0.186 0.71 0.138 0.313	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	3002 2834 3092 2931 2837 2876
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	25.19 0.0158 22.02 0.186 0.71 0.138 0.313	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	3002 2834 3092 2931 2837 2876 3958
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	25.19 0.0158 22.02 0.186 0.71 0.138 0.313	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	3002 2834 3092 2931 2837 2876 3958 4705
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	25.19 0.0158 22.02 0.186 0.71 0.138 0.313 <b>evel</b>	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	3002 2834 3092 2931 2837 2876 3958 4705
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	25.19 0.0158 22.02 0.186 0.71 0.138 0.313 evel	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	3002 2834 3092 293 283 2876 3958 4705
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	25.19 0.0158 22.02 0.186 0.71 0.138 0.313 evel	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	3002 2834 3092 293 283 2876 3958 4705
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	25.19 0.0158 22.02 0.186 0.71 0.138 0.313 evel	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL	3002 2834 3092 2931 2837 2876 3958 4705 6173
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	25.19 0.0158 22.02 0.186 0.71 0.138 0.313 evel	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	3002 2834 3092 293 2837 2876 3958 4705 6173
nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	25.19 0.0158 22.02 0.186 0.71 0.138 0.313 evel 34011 38909	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL	3002 2834 3092 2935 2837 3958 4705 6173

Number of Valid Observations   8		General S	Statistics	
Mainimum   9.7	Number of Valid Observations			3
Mainimum   9.7				
Maximum   189		1		
Mean of log Data   3.5.   Geometric Mean   34.3   SD of log Data   1.5.   Median   37.45   SD   8.96   SD   SD   SD   8.96   SD   8.96   SD   SD   SD   8.96   SD   SD   SD   SD   SD   SD   SD   S				
Geometric Mean   34.3   SD of log Data   1				
Median   37.45   SD   58.96   SS   SS   Coefficient of Variation   1.099   Skewness   2.094				
Std. Error of Mean   20.85     Coefficient of Variation   1.099     Skewness   2.094			SD of log Data 1	l
Std. Error of Mean   20.85     Coefficient of Variation   1.099     Skewness   2.094     Warning: There are only 8 Values in this data     Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions				
Coefficient of Variation   1,099				
Warning: There are only 8 Values in this data  Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions  The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.  Relevant UCL Statistics  Normal Distribution Test Shapiro Wilk Test Statistic   0.736 Shapiro Wilk Test Statistic   0.736 Shapiro Wilk Critical Value   0.818 Data not Normal at 5% Significance Level  Assuming Normal Distribution 95% Student's-t UCL   93.13 95% UCLs (Adjusted for Skewness) 95% Chebyshev (MVUE) UCL   134 95% Adjusted-CLT UCL (Chen-1995)   104.4 97.5% Chebyshev (MVUE) UCL   239 95% Modified-t UCL (Johnson-1978)   95.7 99% Chebyshev (MVUE) UCL   239  Gamma Distribution Test  Data appear Gamma Distribution  k star (bias corrected)   0.87 Data appear Gamma Distributed at 5% Significance Level  Theta Star   61.65 MLE of Mean   53.64 MLE of Standard Deviation   57.5 nu star   13.92 Approximate Chi Square Value (.05)   6.517  Adjusted Chi Square Value (.05)   6.517  Adjusted Chi Square Value (.05)   6.517  Adjusted Chi Square Value   0.394 Anderson-Darling Test Statistic   0.394 Anderson-Darling S% Critical Value   0.732 95% Bootstrap UCL   134 Shappear Gamma Distribution   95% Reproximate Bootstrap UCL   134 Shappear Gamma Distribution   95% Chebyshev (Mean, 8d) UCL   136 Shappear Gamma Distribution   95% Chebyshev (Mean, 8d) UCL   136 Shappear Gamma Distribution   95% Chebyshev (Mean, 8d) UCL   136 Shappear Gamma Distribution   95% Chebyshev (Mean, 8d) UCL   136 Shappear Gamma UCL (Use when n > 40)   114.1				
Warning: There are only 8 Values in this data  Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions  The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.  Relevant UCL Statistics  Normal Distribution Test Shapiro Wilk Test Statistic 0.736 Shapiro Wilk Test Statistic 0.736 Shapiro Wilk Test Statistic 0.94 Shapiro Wilk Critical Value 0.818 Data not Normal at 5% Significance Level  Assuming Normal Distribution  \$\frac{\text{Sasuming Lognormal Distribution}}{\text{Assuming Lognormal Distribution}} \$\frac{\text{Sw Student's+ UCL}}{\text{ 93.13}} \$\text{ 95% Kutchent's+ UCL}} \$\text{ 95.95% Chebyshev (MVUE) UCL} \text{ 169} \$\frac{\text{95% Mudited-CLT UCL}}{\text{ (Chen-1995)}} \text{ 104.4} \$\text{ 97.5% Chebyshev (MVUE) UCL} \text{ 169} \$\text{ 95% Modified-t UCL} (Johnson-1978) \text{ 95.7} \$\text{ 99% Chebyshev (MVUE) UCL} \text{ 239} \$\text{ 239 Gamma Distribution Test} \$\text{ Data appear Gamma Distribution}\$ \$\text{ k star (bias corrected)} \text{ 0.87} \$\text{ Data appear Gamma Distribution}\$ \$\text{ k star (bias corrected)} \text{ 0.87} \$\text{ Data appear Gamma Distribution}\$ \$\text{ Nonparametric Statistic}\$ \$\text{ All LE of Standard Deviation} \text{ 57.5} \$\text{ nu star (13.92} \text{ Nonparametric Statistics}\$ \$\text{ Adjusted Level of Significance} \text{ 0.0195} \text{ 95% Standard Bootstrap UCL} \text{ 85.} \text{ 10.52} \$\text{ Adjusted Level of Significance} \text{ 0.0195} \text{ 95% Bootstrap-UCL} \text{ 13.} \text{ 13.92} \$\text{ Anderson-Darling Test Statistic 0.394} \text{ 95% Bootstrap-UCL} \text{ 13.95} \text{ 13.95} \text{ Nonparametric Statistics}\$ \$\text{ Anderson-Darling Test Statistic 0.192} \text{ 95% Bootstrap-UCL} \text{ 13.86} \text{ Nolmogorov-Smirnov Test Statistic 0.192} \text{ 95% Bootstrap-UCL} \text{ 13.86} \text{ Nolmogorov-Smirnov Test Statistic 0.192} \text{ 95% Bootstrap-UCL} \text{ 10.183} \text{ 10.184} \text				
Relevant UCL Statistics   Relevant UCL Statistics   Normal Distribution Test   Shapiro Wilk Test Statistic   0.736   Shapiro Wilk Test Statistic   0.736   Shapiro Wilk Test Statistic   0.94   Shapiro Wilk Critical Value   0.818   Shapiro Wilk Critical Value   0.818   Shapiro Wilk Critical Value   0.818   Data appear Lognormal at 5% Significance Level   Data appear Lognormal at 5% Significance Level   Data appear Lognormal Distribution   95% Student's-t UCL   93.13   95% LOLLs (Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   124   97.5% Chebyshev (MVUE) UCL   124   97.5% Chebyshev (MVUE) UCL   124   97.5% Chebyshev (MVUE) UCL   125   95% Modified-t UCL (Johnson-1978)   95.7   99% Chebyshev (MVUE) UCL   129   95% Modified-t UCL (Johnson-1978)   95.7   99% Chebyshev (MVUE) UCL   129	Note: It should be noted that even t	hough bootst	rap methods may be performed on this data set,	
Normal Distribution Test   Shapiro Wilk Test Statistic   0.736   Shapiro Wilk Test Statistic   0.94   Shapiro Wilk Critical Value   0.818   Shap			<u>.</u>	
Shapiro Wilk Test Statistic   0.736   Shapiro Wilk Test Statistic   0.9-		Relevant UC		
Shapiro Wilk Critical Value   0.818   Data not Normal at 5% Significance Level   Data appear Lognormal at 5% Significance Level				
Data appear Lognormal at 5% Significance Level				
Assuming Normal Distribution   95% Student's+ UCL   93.13   95% Chebyshev (MVUE) UCL   134   95% Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   134   95% Adjusted-CLT UCL (Chen-1995)   104.4   97.5% Chebyshev (MVUE) UCL   169   95% Modified-t UCL (Johnson-1978)   95.7   99% Chebyshev (MVUE) UCL   239		0.818		).81
95% Student's-t UCL   93.13   95% H-UCL   206  95% UCLs (Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   134  95% Adjusted-CLT UCL (Chen-1995)   104.4   97.5% Chebyshev (MVUE) UCL   134  95% Modified-t UCL (Johnson-1978)   95.7   99% Chebyshev (MVUE) UCL   239  Gamma Distribution Test   Data Distribution  R star (bias corrected)   0.87   Data appear Gamma Distributed at 5% Significance Level  Theta Star   61.65   MLE of Mean   53.64    MLE of Standard Deviation   57.5   Nonparametric Statistics  Approximate Chi Square Value (.05)   6.517   Nonparametric Statistics  Adjusted Level of Significance   0.0195   95% CLT UCL   87.9    Adjusted Chi Square Value   5.291   95% Standard Bootstrap UCL   85.9    Anderson-Darling Test Statistic   0.394   95% Bootstrap UCL   85.9    Anderson-Darling S% Critical Value   0.732   95% Hall's Bootstrap UCL   213    Kolmogorov-Smirnov Test Statistic   0.192   95% Percentile Bootstrap UCL   213    Kolmogorov-Smirnov Test Statistic   0.192   95% Percentile Bootstrap UCL   104    Kolmogorov-Smirnov Test Statistic   0.192   95% Percentile Bootstrap UCL   105    Data appear Gamma Distributed at 5% Significance Level   95% Chebyshev (Mean, Sd) UCL   144    97.5% Chebyshev (Mean, Sd) UCL   144    98% Approximate Gamma UCL (Use when n >= 40)   114.6    98% Approximate Gamma UCL (Use when n <= 40)   114.6    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL 10   10.8    Potential UCL 10   10.8    Potential UCL 10	Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
95% Student's-t UCL   93.13   95% H-UCL   206  95% UCLs (Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   134  95% Adjusted-CLT UCL (Chen-1995)   104.4   97.5% Chebyshev (MVUE) UCL   134  95% Modified-t UCL (Johnson-1978)   95.7   99% Chebyshev (MVUE) UCL   239  Gamma Distribution Test   Data Distribution  R star (bias corrected)   0.87   Data appear Gamma Distributed at 5% Significance Level  Theta Star   61.65   MLE of Mean   53.64    MLE of Standard Deviation   57.5   Nonparametric Statistics  Approximate Chi Square Value (.05)   6.517   Nonparametric Statistics  Adjusted Level of Significance   0.0195   95% CLT UCL   87.9    Adjusted Chi Square Value   5.291   95% Standard Bootstrap UCL   85.9    Anderson-Darling Test Statistic   0.394   95% Bootstrap UCL   85.9    Anderson-Darling S% Critical Value   0.732   95% Hall's Bootstrap UCL   213    Kolmogorov-Smirnov Test Statistic   0.192   95% Percentile Bootstrap UCL   213    Kolmogorov-Smirnov Test Statistic   0.192   95% Percentile Bootstrap UCL   104    Kolmogorov-Smirnov Test Statistic   0.192   95% Percentile Bootstrap UCL   105    Data appear Gamma Distributed at 5% Significance Level   95% Chebyshev (Mean, Sd) UCL   144    97.5% Chebyshev (Mean, Sd) UCL   144    98% Approximate Gamma UCL (Use when n >= 40)   114.6    98% Approximate Gamma UCL (Use when n <= 40)   114.6    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL 10   10.8    Potential UCL 10   10.8    Potential UCL 10	Assuming Normal Distribution		Assuming Lognormal Distribution	
95% UCLs (Adjusted for Skewness)   95% Chebyshev (MVUE) UCL   134   95% Adjusted-CLT UCL (Chen-1995)   104.4   97.5% Chebyshev (MVUE) UCL   169   95% Modified-t UCL (Johnson-1978)   95.7   99% Chebyshev (MVUE) UCL   239		93 13		206
95% Adjusted-CLT UCL (Chen-1995)   104.4   97.5% Chebyshev (MVUE) UCL   169   95% Modified-t UCL (Johnson-1978)   95.7   99% Chebyshev (MVUE) UCL   239		30.10		
Section   Sect		104 4	97.5% Chebyshev (MVUE) UCL 1	169
Data Distribution   Data Distribution   Data Distribution   Data appear Gamma Distributed at 5% Significance Level				
Natar (bias corrected)   0.87		10011		
Theta Star   61.65     MLE of Mean   53.64     MLE of Standard Deviation   57.5     nu star   13.92     Approximate Chi Square Value (.05)   6.517     Adjusted Level of Significance   0.0195   95% CLT UCL   87.9     Adjusted Chi Square Value   5.291   95% Standard Bootstrap UCL   93.     Anderson-Darling Test Statistic   0.394   95% Bootstrap-t UCL   134     Anderson-Darling 5% Critical Value   0.732   95% Hall's Bootstrap UCL   213     Kolmogorov-Smirnov Test Statistic   0.192   95% Percentile Bootstrap UCL   218     Kolmogorov-Smirnov 5% Critical Value   0.3   95% BCA Bootstrap UCL   199     Data appear Gamma Distributed at 5% Significance Level   95% Chebyshev(Mean, Sd) UCL   144     97.5% Chebyshev(Mean, Sd) UCL   183     Assuming Gamma Distribution   99% Chebyshev(Mean, Sd) UCL   261     95% Approximate Gamma UCL (Use when n > = 40)   114.6     95% Adjusted Gamma UCL (Use when n < 40)   141.1     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL to Use   Use 95% Approximate Gamma UCL   114     Potential UCL 105   Use 114     Potential UCL 105   Use 114     Potential UCL 105   Use 114     Potential UCL 105   Use 114     Potential UCL 105   Use 114     Potential UCL 105   Use	Gamma Distribution Test		Data Distribution	
MLE of Mean         53.64           MLE of Standard Deviation nu star         57.5           13.92         13.92           Approximate Chi Square Value (.05) 6.517         Nonparametric Statistics           Adjusted Level of Significance 0.0195         95% CLT UCL 87.5           Adjusted Chi Square Value 5.291         95% Jackknife UCL 93.           Anderson-Darling Test Statistic 0.394         95% Bootstrap-t UCL 134           Anderson-Darling 5% Critical Value 0.732         95% Hall's Bootstrap UCL 213           Kolmogorov-Smirnov Test Statistic 0.192         95% Percentile Bootstrap UCL 109           Kolmogorov-Smirnov 5% Critical Value 0.3         95% BCA Bootstrap UCL 109           Data appear Gamma Distributed at 5% Significance Level         95% Chebyshev(Mean, Sd) UCL 144           95% Approximate Gamma UCL (Use when n >= 40) 114.6         95% Adjusted Gamma UCL (Use when n < 40) 141.1	k star (bias corrected)	0.87	Data appear Gamma Distributed at 5% Significance Lev	vel
MLE of Standard Deviation   57.5			.,	
Nonparametric Statistics   Adjusted Level of Significance   0.0195   95% CLT UCL   87.5	MLE of Mean	53.64		
Approximate Chi Square Value (.05) 6.517  Adjusted Level of Significance 0.0195  Adjusted Chi Square Value 5.291  Adjusted Chi Square Value 5.291  Anderson-Darling Test Statistic 0.394  Anderson-Darling 5% Critical Value 0.732  Anderson-Darling 5% Critical Value 0.732  Kolmogorov-Smirnov Test Statistic 0.192  Bata appear Gamma Distributed at 5% Significance Level  Assuming Gamma Distribution  Potential UCL (Use when n >= 40) 141.1  Potential UCL to Use  Adjusted Chi Square Value (0.0195)  95% CLT UCL 87.9  95% Standard Bootstrap UCL 85.9  95% Bootstrap UCL 134  95% Percentile Bootstrap UCL 213  95% Percentile Bootstrap UCL 109  95% Chebyshev(Mean, Sd) UCL 144  97.5% Chebyshev(Mean, Sd) UCL 144  97.5% Chebyshev(Mean, Sd) UCL 261  95% Adjusted Gamma UCL (Use when n >= 40) 141.1	MLE of Standard Deviation	57.5		
Adjusted Level of Significance   0.0195   95% CLT UCL   87.5   Adjusted Chi Square Value   5.291   95% Jackknife UCL   93.1   Anderson-Darling Test Statistic   0.394   95% Bootstrap UCL   134   Anderson-Darling 5% Critical Value   0.732   95% Hall's Bootstrap UCL   213   Kolmogorov-Smirnov Test Statistic   0.192   95% Percentile Bootstrap UCL   88.6   Kolmogorov-Smirnov 5% Critical Value   0.3   95% BCA Bootstrap UCL   109   Data appear Gamma Distributed at 5% Significance Level   95% Chebyshev(Mean, Sd) UCL   144   97.5% Chebyshev(Mean, Sd) UCL   183   Assuming Gamma UCL (Use when n >= 40)   114.6   95% Adjusted Gamma UCL (Use when n < 40)   141.1   Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL to Use   Use 95% Approximate Gamma UCL   114    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Potential UCL 10   109    Poten	nu star	13.92		
Adjusted Chi Square Value 5.291 95% Jackknife UCL 93.  Anderson-Darling Test Statistic 0.394 95% Bootstrap-t UCL 134  Anderson-Darling 5% Critical Value 0.732 95% Hall's Bootstrap UCL 213  Kolmogorov-Smirnov Test Statistic 0.192 95% Percentile Bootstrap UCL 288.6  Kolmogorov-Smirnov 5% Critical Value 0.3 95% BCA Bootstrap UCL 109  Data appear Gamma Distributed at 5% Significance Level 95% Chebyshev(Mean, Sd) UCL 144  97.5% Chebyshev(Mean, Sd) UCL 183  Assuming Gamma Distribution 99% Chebyshev(Mean, Sd) UCL 261  95% Approximate Gamma UCL (Use when n >= 40) 114.6  95% Adjusted Gamma UCL (Use when n < 40) 141.1	Approximate Chi Square Value (.05)	6.517		
95% Standard Bootstrap UCL   85.5	, , , , , , , , , , , , , , , , , , , ,			
Anderson-Darling Test Statistic 0.394 95% Bootstrap-t UCL 134  Anderson-Darling 5% Critical Value 0.732 95% Hall's Bootstrap UCL 213  Kolmogorov-Smirnov Test Statistic 0.192 95% Percentile Bootstrap UCL 88.6  Kolmogorov-Smirnov 5% Critical Value 0.3 95% BCA Bootstrap UCL 109  Data appear Gamma Distributed at 5% Significance Level 95% Chebyshev(Mean, Sd) UCL 144  97.5% Chebyshev(Mean, Sd) UCL 183  Assuming Gamma Distribution 99% Chebyshev(Mean, Sd) UCL 261  95% Approximate Gamma UCL (Use when n >= 40) 114.6  95% Adjusted Gamma UCL (Use when n < 40) 141.1  Potential UCL to Use Use 95% Approximate Gamma UCL 114	Adjusted Chi Square Value	5.291		
Anderson-Darling 5% Critical Value   0.732   95% Hall's Bootstrap UCL   213  Kolmogorov-Smirnov Test Statistic   0.192   95% Percentile Bootstrap UCL   88.6  Kolmogorov-Smirnov 5% Critical Value   0.3   95% BCA Bootstrap UCL   109  Data appear Gamma Distributed at 5% Significance Level   95% Chebyshev(Mean, Sd) UCL   144  97.5% Chebyshev(Mean, Sd) UCL   183  Assuming Gamma Distribution   99% Chebyshev(Mean, Sd) UCL   261  95% Approximate Gamma UCL (Use when n >= 40)   114.6  95% Adjusted Gamma UCL (Use when n < 40)   141.1  Potential UCL to Use   Use 95% Approximate Gamma UCL   114				
Kolmogorov-Smirnov Test Statistic 0.192 95% Percentile Bootstrap UCL 88.6  Kolmogorov-Smirnov 5% Critical Value 0.3 95% BCA Bootstrap UCL 109  Data appear Gamma Distributed at 5% Significance Level 95% Chebyshev(Mean, Sd) UCL 144  97.5% Chebyshev(Mean, Sd) UCL 183  Assuming Gamma Distribution 99% Chebyshev(Mean, Sd) UCL 261  95% Approximate Gamma UCL (Use when n >= 40) 114.6  95% Adjusted Gamma UCL (Use when n < 40) 141.1  Potential UCL to Use Use 95% Approximate Gamma UCL 114				
Kolmogorov-Smirnov 5% Critical Value   0.3 95% BCA Bootstrap UCL   109  Data appear Gamma Distributed at 5% Significance Level 95% Chebyshev(Mean, Sd) UCL   144  97.5% Chebyshev(Mean, Sd) UCL   183  Assuming Gamma Distribution 99% Chebyshev(Mean, Sd) UCL   261  95% Approximate Gamma UCL (Use when n >= 40)   114.6  95% Adjusted Gamma UCL (Use when n < 40)   141.1  Potential UCL to Use Use 95% Approximate Gamma UCL   114				
Data appear Gamma Distributed at 5% Significance Level95% Chebyshev(Mean, Sd) UCL14497.5% Chebyshev(Mean, Sd) UCL183Assuming Gamma Distribution99% Chebyshev(Mean, Sd) UCL26195% Approximate Gamma UCL (Use when n >= 40)114.695% Adjusted Gamma UCL (Use when n < 40)			·	
97.5% Chebyshev(Mean, Sd) UCL   183   Assuming Gamma Distribution   99% Chebyshev(Mean, Sd) UCL   261   95% Approximate Gamma UCL (Use when n >= 40)   114.6     95% Adjusted Gamma UCL (Use when n < 40)   141.1     Potential UCL to Use   Use 95% Approximate Gamma UCL   114				
Assuming Gamma Distribution  99% Chebyshev (Mean, Sd) UCL 95% Approximate Gamma UCL (Use when n >= 40) 114.6 95% Adjusted Gamma UCL (Use when n < 40) 141.1  Potential UCL to Use  Use 95% Approximate Gamma UCL 114	Data appear Gamma Distributed at 5% Significance L	evel		
95% Approximate Gamma UCL (Use when n >= 40)       114.6         95% Adjusted Gamma UCL (Use when n < 40)				
95% Adjusted Gamma UCL (Use when n < 40) 141.1  Potential UCL to Use  Use 95% Approximate Gamma UCL 114			99% Chebyshev(Mean, Sd) UCL 2	261
Potential UCL to Use Use 95% Approximate Gamma UCL 114				
		141.1		
Note: Congressions reporting the coloration of a OFW LIOL are provided to be a the control of the coloration of a OFW LIOL		1	Lico 95% Approximate Commo LICL 1	114.
NOTE: SUCCESSIONS REASONING THE SELECTION OF A MAY, LICTUATE TO PAIN THE HEAT TO SELECT THE MASS APPROXIMATE DEW. LICTUAL	95% Adjusted Gamma UCL (Use when n < 40)		Ose 35 % Approximate Gamina OCL 1	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and laci (2002)	95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use	LICI oro pro		

	General	Statistics	
Number of Valid Observations		Number of Distinct Observations	7
Number of Missing Values		Number of Blourier Observations	,
Raw Statistics		Log-transformed Statistics	
Minimum	157	Minimum of Log Data	5.05
Maximum		Maximum of Log Data	
	356.2	Mean of log Data	
Geometric Mean		SD of log Data	
Median		OD 01 log Data	0.43
	160.9		
Std. Error of Mean			
Coefficient of Variation			
Skewness			
It is suggested to collect at lea	ast 8 to 10 ob	compute meaningful and reliable test statistics and estimates! servations using these statistical methods! ves (DQO) based sample size and analytical results.	
ii possible compute and collect Data Qu	dailty Objectiv	ves (DQO) based sample size and analytical results.	
Warning	There are on	nly 7 Values in this data	
		trap methods may be performed on this data set,	
		reliable enough to draw conclusions	
the resulting calculations	s may not be	reliable enough to draw conclusions	
The Physical Company of the Company		and the same hards are smallered 40 dF above and are	
I he literature suggests to use bootstra	ap methods o	on data sets having more than 10-15 observations.	
	<b>5</b>		
N IBLURA T	Relevant U	CL Statistics	
Normal Distribution Test	T	Lognormal Distribution Test	
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.80
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	171 1	95% H-UCL	E02
	474.4		
95% UCLs (Adjusted for Skewness)	100 7	95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)		97.5% Chebyshev (MVUE) UCL	//3.
95% Modified-t UCL (Johnson-1978)	4/5.4	99% Chebyshev (MVUE) UCL	1020
Gamma Distribution Test		Data Distribution	
	3.137	Data appear Normal at 5% Significance Level	
k star (bias corrected)			_
k star (bias corrected) Theta Star			
	113.6		
Theta Star MLE of Mean	113.6 356.2		
Theta Star MLE of Mean MLE of Standard Deviation	113.6 356.2 201.1		
Theta Star MLE of Mean MLE of Standard Deviation nu star	113.6 356.2 201.1 43.91	Nonparametric Statistics	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05)	113.6 356.2 201.1 43.91 29.72	Nonparametric Statistics	456
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance	113.6 356.2 201.1 43.91 29.72 0.0158	95% CLT UCL	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05)	113.6 356.2 201.1 43.91 29.72 0.0158	95% CLT UCL 95% Jackknife UCL	474.
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	113.6 356.2 201.1 43.91 29.72 0.0158 26.24	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL	474. 449
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	113.6 356.2 201.1 43.91 29.72 0.0158 26.24	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL	474. 449 489.
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	113.6 356.2 201.1 43.91 29.72 0.0158 26.24 0.255 0.71	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL	474. 449 489. 447.
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	113.6 356.2 201.1 43.91 29.72 0.0158 26.24 0.255 0.71 0.184	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	474. 449 489. 447. 446
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	113.6 356.2 201.1 43.91 29.72 0.0158 26.24 0.255 0.71 0.184 0.313	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	474. 449 489. 447. 446 455.
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	113.6 356.2 201.1 43.91 29.72 0.0158 26.24 0.255 0.71 0.184 0.313	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	474. 449 489. 447. 446 455. 621.
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	113.6 356.2 201.1 43.91 29.72 0.0158 26.24 0.255 0.71 0.184 0.313	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	474. 449 489. 447. 446 455. 621. 735.
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	113.6 356.2 201.1 43.91 29.72 0.0158 26.24 0.255 0.71 0.184 0.313	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	474. 449 489. 447. 446 455. 621. 735.
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	113.6 356.2 201.1 43.91 29.72 0.0158 26.24 0.255 0.71 0.184 0.313	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	474. 449 489. 447. 446 455. 621. 735.
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	113.6 356.2 201.1 43.91 29.72 0.0158 26.24 0.255 0.71 0.184 0.313 evel	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	474 449 489 447 446 455 621 735
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	113.6 356.2 201.1 43.91 29.72 0.0158 26.24 0.255 0.71 0.184 0.313 evel	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	474. 449 489. 447. 446 455. 621. 735.
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	113.6 356.2 201.1 43.91 29.72 0.0158 26.24 0.255 0.71 0.184 0.313 evel	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	474. 449 489. 447. 446 455. 621. 735. 961.
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	113.6 356.2 201.1 43.91 29.72 0.0158 26.24 0.255 0.71 0.184 0.313 evel	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL	474. 449. 489. 447. 446. 455. 621. 735. 961.
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Former Building 234
Subsurface Soil

	General UCL Statistics for	r Data Sate	with Non-Detects	
User Selected Options	ichcial COL Cialiblico loi	Data Octo	WILLIAM	
	:\Work Folders\Projects\l	Newport\De	recktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - Bui	ilding 234.x
	)FF			
	5%			
Number of Bootstrap Operations   2	000			
BENZO(A)PYRENE				
		General S	Statistics	
	Number of Valid Data	10	Number of Detected Data	2
	Distinct Detected Data	2	Number of Non-Detect Data	8
Nur	mber of Missing Values	4	Percent Non-Detects	80.00%
Raw Stat	tietiee		Log-transformed Statistics	
Naw Stat	Minimum Detected	41.5	Minimum Detected	3.726
	Maximum Detected	55	Maximum Detected	4.007
	Mean of Detected	48.25	Mean of Detected	3.867
	SD of Detected	9.546	SD of Detected	0.199
	Minimum Non-Detect	340	Minimum Non-Detect	5.829
	Maximum Non-Detect	3900	Maximum Non-Detect	8.269
Mater Data have resoluted a DI 11 C	ZM Matha el le me	4 - 4	Nimbon 1 N 5	4.0
Note: Data have multiple DLs - Use of he For all methods (except KM, DL/2, and		uea	Number treated as Non-Detect Number treated as Detected	10
For all methods (except Kivi, DL/2, and			Single DL Non-Detect Percentage	100.00%
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Gamma Distribution Test with Detected Values Only	r	Data Distribution Test with Detected Values Only		
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)		
Theta Star	N/A			
nu star	N/A			
A-D Test Statistic	N/A	Nonparametric Statistics		
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method		
K-S Test Statistic	N/A	Mean	48.2	
5% K-S Critical Value	N/A	SD	6.7	
Data not Gamma Distributed at 5% Significance Leve	el	SE of Mean	6.7	
		95% KM (t) UCL	60.62	
Assuming Gamma Distribution		95% KM (z) UCL	59.35	
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	64.85	
Minimum	N/A	95% KM (bootstrap t) UCL	N/A	
Maximum	N/A	95% KM (BCA) UCL	55	
Mean	N/A	95% KM (Percentile Bootstrap) UCL	55	
Median	N/A	95% KM (Chebyshev) UCL	77.67	
SD	N/A	97.5% KM (Chebyshev) UCL	90.4	
k star	N/A	99% KM (Chebyshev) UCL	115.4	
Theta star	N/A			
Nu star	N/A	Potential UCLs to Use		
AppChi2	N/A	95% KM (t) UCL	60.62	
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	55	
95% Adjusted Gamma UCL (Use when n < 40)	N/A			
	ded UCL ex	ceeds the maximum observation		
/2 is not a recommended method.				
		wided to help the user to select the most appropriate 95% UCL.		
		ulation studies summarized in Singh, Maichle, and Lee (2006).		
For additional insight	, the user m	ay want to consult a statistician.		

	General Stat	istics	
Number of Valid Data	16	Number of Detected Data	
Number of Distinct Detected Data	15	Number of Non-Detect Data	
		Percent Non-Detects	6.2
		·	
Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.2	Minimum Detected	0.
Maximum Detected	42 12.77	Maximum Detected	3
Mean of Detected SD of Detected	12.77	Mean of Detected SD of Detected	0
Minimum Non-Detect	3.5	Minimum Non-Detect	1
Maximum Non-Detect	3.5	Maximum Non-Detect	1
Maximum Non Belest	0.0	Maximum Non Beleet	
	UCL Statis	ics	
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.85	Shapiro Wilk Test Statistic	
5% Shapiro Wilk Critical Value	0.881	5% Shapiro Wilk Critical Value	0
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Accoming Name of Distribution		Assuming Lognormal Distribution	
Assuming Normal Distribution DL/2 Substitution Method		DL/2 Substitution Method	
Mean	12.08	Mean	2
SD	10.23	SD	- 0
95% DL/2 (t) UCL	16.56	95% H-Stat (DL/2) UCL	2
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	10.51	Mean in Log Scale	2
SD	12.05	SD in Log Scale	C
95% MLE (t) UCL	15.8	Mean in Original Scale	1
95% MLE (Tiku) UCL	15.99	SD in Original Scale	1
		95% t UCL 95% Percentile Bootstrap UCL	1 1
		95% Percentile Bootstrap OCL	1
		95% H UCL	2
Gamma Distribution Test with Detected Values Only	v	Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.391	Data appear Gamma Distributed at 5% Significance Leve	əl
Theta Star	9.175	•	
nu star	41.74		
A-D Test Statistic	0.254	Nonparametric Statistics	
5% A-D Critical Value	0.751	Kaplan-Meier (KM) Method	
K-S Test Statistic 5% K-S Critical Value	0.751 0.225	Mean SD	1
Data appear Gamma Distributed at 5% Significance Le		SE of Mean	2
Data appear Garrina Distributed at 5% Significance Le	3461	95% KM (t) UCL	
Assuming Gamma Distribution		95% KM (z) UCL	-
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1
Minimum	0.000001	95% KM (bootstrap t) UCL	
Maximum	42	95% KM (BCA) UCL	
Mean	11.97	95% KM (Percentile Bootstrap) UCL	•
Median	9.75	95% KM (Chebyshev) UCL	2
Wedian	10.36	97.5% KM (Chebyshev) UCL	2
SD	0.45	99% KM (Chebyshev) UCL	3
SD k star			
SD k star Theta star	26.6		
SD k star Theta star Nu star	26.6 14.4	Potential UCLs to Use	
SD k star Theta star Nu star AppChi2	26.6 14.4 6.844	Potential UCLs to Use 95% KM (Chebyshev) UCL	2
SD k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40)	26.6 14.4 6.844 25.18		2
SD k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)	26.6 14.4 6.844		2
SD k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40)	26.6 14.4 6.844 25.18		
k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40) DL/2 is not a recommended method.	26.6 14.4 6.844 25.18 27.53		2

Hear Calacted Ontices	General UCL Statistics for	or Full Data Sets	<u> </u>	
User Selected Options From File	C:\Work Folders\Projects	:\Newport\Derco	ktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - Bu	ilding
Full Precision	OFF	Nivewportibered	NOTION DIGITAL HIGH MISK ASSESSITIETINE PCS TOUDS UTIACE SOIL - DC	illullig
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
Trained of Bootonap operations				
LUMINUM				
		General Stat		
Numl	ber of Valid Observations	16	Number of Distinct Observations	16
Raw S	tatistics		Log-transformed Statistics	
	Minimum	1690	Minimum of Log Data	7.432
	Maximum	23300	Maximum of Log Data	10.06
	Mean	9988	Mean of log Data	9.003
	Geometric Mean	8124	SD of log Data	0.718
	Median			
		5995		
	Std. Error of Mean			
	Coefficient of Variation			
	Skewness			
	0.101111000	0.020		
Nowed Dist	ribution Test	Relevant UCL S		
	hapiro Wilk Test Statistic	0.04	Lognormal Distribution Test Shapiro Wilk Test Statistic	0.04
	<u> </u>			
	hapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data appear Normal at	t 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Nort	mal Distribution		Assuming Lognormal Distribution	
Assuming Non	95% Student's-t UCL	12615	95% H-UCL	16110
05% LICLs (Adiu	sted for Skewness)	12013	95% Chebyshev (MVUE) UCL	
	ed-CLT UCL (Chen-1995)	12705	97.5% Chebyshev (MVUE) UCL	22555
	ed-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL	
93 % Woulle	30-1 OCL (JOHNSON-1976)	12054	99 % Chebyshev (MVOE) OCL)	29019
Gamma Disi	tribution Test		Data Distribution	
	k star (bias corrected)	2.135	Data appear Normal at 5% Significance Level	
	Theta Star	4679		
	MLE of Mean	9988		
M	LE of Standard Deviation	6836		
	nu star			
Approximat	e Chi Square Value (.05)		Nonparametric Statistics	
	sted Level of Significance		95% CLT UCL	12453
	djusted Chi Square Value		95% Jackknife UCL	
A	guestou om oquaro valuo		95% Standard Bootstrap UCL	
	son-Darling Test Statistic	0 332	95% Standard Bootstrap GCL 95% Bootstrap-t UCL	
Andor	2011-Dalling 1621 Statistic		95% Bootstrap-t OCL 95% Hall's Bootstrap UCL	
		n 747	·	12654
Anderson-	Darling 5% Critical Value		0E0/ Darcantila Bastatra- LICI	
Anderson- Kolmogor	Darling 5% Critical Value ov-Smirnov Test Statistic	0.146		
Anderson- Kolmogor Kolmogorov-S	Darling 5% Critical Value ov-Smirnov Test Statistic Smirnov 5% Critical Value	0.146 0.217	95% BCA Bootstrap UCL	12648
Anderson- Kolmogor	Darling 5% Critical Value ov-Smirnov Test Statistic Smirnov 5% Critical Value	0.146 0.217	95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	12648 16520
Anderson- Kolmogor Kolmogorov-S <b>Data appear Gamma Distrib</b> u	Darling 5% Critical Value ov-Smirnov Test Statistic smirnov 5% Critical Value uted at 5% Significance L	0.146 0.217	95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	12648 16520 19347
Anderson- Kolmogor Kolmogorov-S Data appear Gamma Distribu Assuming Gam	Darling 5% Critical Value ov-Smirnov Test Statistic smirnov 5% Critical Value uted at 5% Significance L mma Distribution	0.146 0.217 evel	95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	12648 16520 19347
Anderson- Kolmogorov-S Data appear Gamma Distribu  Assuming Gam 95% Approximate Gamma	Darling 5% Critical Value ov-Smirnov Test Statistic mirnov 5% Critical Value uted at 5% Significance L ma Distribution  UCL (Use when n >= 40)	0.146 0.217 <b>evel</b> 13567	95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	12648 16520 19347
Anderson- Kolmogorov-S Data appear Gamma Distribu  Assuming Gam  95% Approximate Gamma	Darling 5% Critical Value ov-Smirnov Test Statistic smirnov 5% Critical Value uted at 5% Significance L mma Distribution	0.146 0.217 <b>evel</b> 13567	95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	12648 16520 19347
Anderson- Kolmogorov-S  Data appear Gamma Distribu  Assuming Gam  95% Approximate Gamma  95% Adjusted Gamma	Darling 5% Critical Value ov-Smirnov Test Statistic mirnov 5% Critical Value uted at 5% Significance L ma Distribution  UCL (Use when n >= 40)	0.146 0.217 <b>evel</b> 13567	95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	12648 16520 19347 24900
Anderson- Kolmogorov-S  Data appear Gamma Distribu  Assuming Gam  95% Approximate Gamma  95% Adjusted Gamma	Darling 5% Critical Value ov-Smirnov Test Statistic smirnov 5% Critical Value uted at 5% Significance Lama Distribution  UCL (Use when n >= 40) a UCL (Use when n < 40)  JCL to Use	0.146 0.217 evel 13567 14059	95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL  Use 95% Student's-t UCL	12648 16520 19347 24900 12615
Anderson- Kolmogorov-S Kolmogorov-S Data appear Gamma Distribu  Assuming Gam 95% Approximate Gamma 95% Adjusted Gamma  Potential U  Note: Suggestions regardi	Darling 5% Critical Value ov-Smirnov Test Statistic smirnov 5% Critical Value ated at 5% Significance Lama Distribution  UCL (Use when n >= 40) at UCL (Use when n < 40)  JCL to Use  Ing the selection of a 95%	0.146 0.217 evel 13567 14059 UCL are provid	95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL  99% Chebyshev(Mean, Sd) UCL  Use 95% Student's-t UCL	12648 16520 19347 24900 12615
Anderson- Kolmogorov-S Kolmogorov-S Data appear Gamma Distribut  Assuming Gam 95% Approximate Gamma 95% Adjusted Gamma Potential U  Note: Suggestions regardi	Darling 5% Critical Value ov-Smirnov Test Statistic smirnov 5% Critical Value uted at 5% Significance Lama Distribution  UCL (Use when n >= 40) a UCL (Use when n < 40)  JCL to Use  Ing the selection of a 95% as are based upon the res	0.146 0.217 evel 13567 14059 UCL are providults of the simula	95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL 99% Chebyshev(Mean, Sd) UCL  Use 95% Student's-t UCL	12648 16520 19347 24900 12615

	General	Statistics
Number of Valid Observations	16	Number of Distinct Observations   16
Raw Statistics		Log-transformed Statistics
Minimum	2.2	Minimum of Log Data 0.788
Maximum		Maximum of Log Data 4.098
Mean	18.47	Mean of log Data 2.692
Geometric Mean	14.77	SD of log Data 0.738
Median	16.3	
	13.31	
Std. Error of Mean	3.328	
Coefficient of Variation	0.721	
Skewness	2.169	
	Relevant U	CL Statistics
Normal Distribution Test		Lognormal Distribution Test
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic 0.932
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value 0.887
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	24.31	95% H-UCL 30.22
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 35.22
95% Adjusted-CLT UCL (Chen-1995)	25.87	97.5% Chebyshev (MVUE) UCL 42.24
95% Modified-t UCL (Johnson-1978)	24.61	99% Chebyshev (MVUE) UCL 56.04
Gamma Distribution Test		Data Distribution
k star (bias corrected)	1.981	Data appear Gamma Distributed at 5% Significance Level
Theta Star		, , , , , , , , , , , , , , , , , , ,
MLE of Mean		
MLE of Standard Deviation	13.12	
nu star		
Approximate Chi Square Value (.05)	46.07	Nonparametric Statistics
Adjusted Level of Significance	0.0335	95% CLT UCL 23.95
Adjusted Chi Square Value	44.39	95% Jackknife UCL 24.31
		95% Standard Bootstrap UCL 23.86
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 28.06
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 53.4
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 23.82
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 26.05
Data appear Gamma Distributed at 5% Significance L	.evel	95% Chebyshev(Mean, Sd) UCL 32.98
Assumbs 0 Bit is it		97.5% Chebyshev (Mean, Sd) UCL 39.25
Assuming Gamma Distribution	05.44	99% Chebyshev(Mean, Sd) UCL 51.58
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)		
3070 / Mgdddd ddinind GOL (GGG MIGHTI S 40)		
Potential UCL to Use		Use 95% Approximate Gamma UCL 25.41
Note: Suggestions regarding the selection of a 95%	UCL are pr	ovided to help the user to select the most appropriate 95% UCL.
		mulation studies summarized in Singh, Singh, and laci (2002)
		sight, the user may want to consult a statistician.

		I Statistics
Number of Valid Observations	16	Number of Distinct Observations 15
Raw Statistics		Log-transformed Statistics
Minimum	1 1	Minimum of Log Data 0.095
Maximum		Maximum of Log Data 3.219
	10.65	Mean of log Data 2.146
Geometric Mean		SD of log Data 0.79
Median		3D of log Data 0.73
	6.043	
Std. Error of Mean		
Coefficient of Variation		
Skewness		
Chewness	0.470	
	Relevant l	JCL Statistics
Normal Distribution Test	T=	Lognormal Distribution Test
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic 0.875
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value 0.887
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	12.2	95% H-UCL 19.04
95% UCLs (Adjusted for Skewness)	13.3	95% Chebyshev (MVUE) UCL 21.89
95% Adjusted-CLT UCL (Chen-1995)	13 33	97.5% Chebyshev (MVUE) UCL 26.43
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL 35.35
33 % Woullica-t OOE (001113011-1370)	10.00	33 % Chebyshev (WVOE) COE 35.55
Gamma Distribution Test		Data Distribution
k star (bias corrected)	2.013	Data appear Normal at 5% Significance Level
Theta Star	5.29	
MLE of Mean		
MLE of Standard Deviation	7.506	
nu star	-	
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 13.13
Adjusted Chi Square Value	45.26	95% Jackknife UCL 13.3
		95% Standard Bootstrap UCL 13.05
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 13.52
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 13.83
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 13.04
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 13.24
Data follow Appr. Gamma Distribution at 5% Significance	e Level	95% Chebyshev(Mean, Sd) UCL 17.23
		97.5% Chebyshev(Mean, Sd) UCL 20.08
Assuming Gamma Distribution	14.03	99% Chebyshev(Mean, Sd) UCL 25.68
95% Approximate Gamma UCL (Use when n >= 40)		
95% Adjusted Gamma UCL (Use when n < 40)	15.16	
Potential UCL to Use	1	Use 95% Student's-t UCL 13.3
		rovided to help the user to select the most appropriate 95% UCL.
		simulation studies summarized in Singh, Singh, and laci (2002)
		nsight, the user may want to consult a statistician.

	Genera	al Statistics	
Number of Valid Observations		Number of Distinct Observations	16
	1.4		
Raw Statistics		Log-transformed Statistics	
Minimum	4.1	Minimum of Log Data	1.41
Maximum	46.1	Maximum of Log Data	3.83
	25.53	Mean of log Data	
Geometric Mean		SD of log Data	0.706
Median			
	12.98		
Std. Error of Mean			
Coefficient of Variation	_		
Skewness	-0.124		
	Relevant I	JCL Statistics	
Normal Distribution Test	1 televant t	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.955	Shapiro Wilk Test Statistic	0.872
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
Data appear Normal at 5% Significance Level	1	Data not Lognormal at 5% Significance Level	
11			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	31.22	95% H-UCL	
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)		97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)	31.2	99% Chebyshev (MVUE) UCL	76.64
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2 406	Data appear Normal at 5% Significance Level	
Theta Star		Data appear Normal at 6% Oignineance Eever	
MLE of Mean			
MLE of Standard Deviation			
nu star			
Approximate Chi Square Value (.05)	57.78	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	30.8
Adjusted Chi Square Value	55.89	95% Jackknife UCL	
		95% Standard Bootstrap UCL	
Anderson-Darling Test Statistic		95% Bootstrap-t UCL	
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL	
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL	
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL	
Data appear Gamma Distributed at 5% Significance L	<u>.evel</u>	95% Chebyshev(Mean, Sd) UCL	
A course of Common Distribution		97.5% Chebyshev (Mean, Sd) UCL	
Assuming Gamma Distribution	24.02	99% Chebyshev(Mean, Sd) UCL	37.02
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)			
Jo /u Aujusteu Gamina OCL (OSE WHEIT II < 40)	33.17		
Potential UCL to Use		Use 95% Student's-t UCL	31.22
	LICL are r	provided to help the user to select the most appropriate 95% UCL	
Note: Suggestions regarding the selection of a 95%	o OOL ale p	simulation studies summarized in Singh, Singh, and laci (2002)	
These recommendations are based upon the res	sults of the s		
These recommendations are based upon the res	sults of the s	nsight, the user may want to consult a statistician.	
These recommendations are based upon the res and Singh and Singh (2003). For	sults of the s additional in		
These recommendations are based upon the res and Singh and Singh (2003). For Note: For highly	sults of the s additional in y negative-s	skewed data, confidence limits	
These recommendations are based upon the res and Singh and Singh (2003). For Note: For highly (e.g., Chen, Johr	sults of the s additional in y negative-s nson, Logno	skewed data, confidence limits ormal, and Gamma) may not be	
These recommendations are based upon the res and Singh and Singh (2003). For Note: For highly (e.g., Chen, Johr reliable. Ch	sults of the s additional in y negative-s nson, Logno hen's and Jo	skewed data, confidence limits	

## PROUCL OUTPUT - FORMER BUILDING 234 SUBSURFACE SOIL

		Statistics	
Number of Valid Observations	16	Number of Distinct Observations	16
Raw Statistics	14000	Log-transformed Statistics	0.000
Minimum		Minimum of Log Data	
Maximum	26186	Maximum of Log Data Mean of log Data	
Geometric Mean		SD of log Data	
Median		SD 01 log Data	0.032
	12257		
Std. Error of Mean			
Coefficient of Variation	0.468		
Skewness			
	Relevant L	ICL Statistics	
Normal Distribution Test	,	Lognormal Distribution Test	
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Accuming Normal Distribution		Accuming Lagnormal Distribution	
Assuming Normal Distribution 95% Student's-t UCL	21559	Assuming Lognormal Distribution  95% H-UCL	10367
95% UCLs (Adjusted for Skewness)	31336	95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)	31134	97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL	
	101011	oon chasyanar (mrez) cez	70000
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.817	Data appear Normal at 5% Significance Level	
Theta Star	9297		
MLE of Mean	26186		
MLE of Standard Deviation	15603		
nu star			
Approximate Chi Square Value (.05)		Nonparametric Statistics	
Adjusted Level of Significance		95% CLT UCL	
Adjusted Chi Square Value	67.16	95% Jackknife UCL	
A 1 B 5 T 10 11 11	2 221	95% Standard Bootstrap UCL	
Anderson-Darling Test Statistic		95% Bootstrap-t UCL	
Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic		95% Hall's Bootstrap UCL	
		95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	
Kolmogorov-Smirnov 5% Critical Value  Data follow Appr. Gamma Distribution at 5% Significance		95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	
- Σαια Ισπο <del>νι Αρμί. Gamina Distribution at 3% Significand</del>	- read	97.5% Chebyshev(Mean, Sd) UCL	
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	
95% Approximate Gamma UCL (Use when n >= 40)	34087	con chesyener (mean, ea) cez	00070
95% Adjusted Gamma UCL (Use when n < 40)			
Potential UCL to Use	.1	Use 95% Student's-t UCL	31558
		rovided to help the user to select the most appropriate 95% UCL	
		imulation studies summarized in Singh, Singh, and laci (2002)	
and Singh and Singh (2003). For	additional in	sight, the user may want to consult a statistician.	
= ····		Louis didata and didata and Banka	
Nata: Carbiabh	/ negative-s	kewed data, confidence limits	
(e.g., Chen, Johr		rmal, and Gamma) may not be	
(e.g., Chen, Johr reliable. Ch	hen's and Jo	hnson's methods provide	
(e.g., Chen, Johr reliable. Ch	hen's and Jo		

## PROUCL OUTPUT - FORMER BUILDING 234 SUBSURFACE SOIL

	General	Statistics
Number of Valid Observations		Number of Distinct Observations 16
Dow Chatlatica		Low Amount formers of Charlistics
Raw Statistics	70.0	Log-transformed Statistics
Minimum		Minimum of Log Data 4.364
Maximum		Maximum of Log Data 7.804
Mean		Mean of log Data 5.723
Geometric Mean		SD of log Data 0.842
Median	559.5	
Std. Error of Mean		
Coefficient of Variation		
Skewness		
Skewiless	3.407	
	Relevant U	CL Statistics
Normal Distribution Test	1.	Lognormal Distribution Test
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic 0.934
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value 0.887
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	605.2	95% H-UCL 746.1
95% UCLs (Adjusted for Skewness)	093.2	95% Chebyshev (MVUE) UCL 842.6
95% Adjusted-CLT UCL (Chen-1995)	807.4	97.5% Chebyshev (MVUE) UCL 1024
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL 1380
3070 mouniou 100 <u>2</u> (comison 1079)	17.10	33 /3 5.163/3.163 (11.162) 5.52   1.663
Gamma Distribution Test		Data Distribution
k star (bias corrected)		Data Follow Appr. Gamma Distribution at 5% Significance Leve
Theta Star		
MLE of Mean		
MLE of Standard Deviation		
nu star		
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 680.1
Adjusted Chi Square Value	24.25	95% Jackknife UCL 695.2
		95% Standard Bootstrap UCL 667.4
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 1158
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 1694
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 705
Kolmogorov-Smirnov 5% Critical Value	0.219	95% BCA Bootstrap UCL 852.3
Data follow Appr. Gamma Distribution at 5% Significance	e Level	95% Chebyshev(Mean, Sd) UCL 1060
A		97.5% Chebyshev(Mean, Sd) UCL 1324
Assuming Gamma Distribution	CO 4 1	99% Chebyshev(Mean, Sd) UCL 1842
95% Approximate Gamma UCL (Use when n >= 40)		
95% Adjusted Gamma UCL (Use when n < 40)	/ 18.5	
Potential UCL to Use		Use 95% Approximate Gamma UCL 684.1
Note: Suggestions regarding the selection of a 95%	UCL are pr	rovided to help the user to select the most appropriate 95% UCL.
		imulation studies summarized in Singh, Singh, and laci (2002)

**South Waterfront** 

**Subsurface Soil** 

	General UCL Statistics for	or Full Data	Sets					
User Selected Options								
From File	C:\Work Folders\Projects	\Newport\De	erecktor\Draf	t Final Risk	Assessment\	EPCs\Subsu	rface Soil - S	outh Waterfr
Full Precision	OFF							
Confidence Coefficient	95%							
Number of Bootstrap Operations	2000		1	1		1	1	r
ALUMINUM								
		Conorol	Statistics					
Num	ber of Valid Observations		Statistics		Numbe	er of Distinct (	Observations	6
Davis 0	a alala							
Raw S	tatistics	E000			Log-transfor			0.676
	Minimum						n of Log Data n of Log Data	
	Maximum	12018					n of Log Data	
	Geometric Mean						n of log Data  D of log Data	
	Median					5	oi iog Data	0.434
		4577						
	Std. Error of Mean							
	Coefficient of Variation							
	Skewness							
	CROWNESS	0.00						
Warning: A sample size	of 'n' = 6 may not adequa	te enough to	compute me	eaningful an	d reliable tes	t statistics a	nd estimates	
ia :		-4 O 4- 40 -b		-! <b>!</b>		the edel		
	suggested to collect at lean npute and collect Data Qu						lto	
ii possible con	ilpute and collect Data Qu	anty Objecti	ves (DQO) b	aseu sampi	e size aliu ai		iito.	
	Warning:	There are or	ly 6 Values	in this data				
Note: It sh	nould be noted that even t				rformed on t	his data set.		
	the resulting calculations							
	<b>V</b>							
The literature	e suggests to use bootstra	ap methods	on data sets	having more	e than 10-15	observations	3.	
		Relevant U	CL Statistics					
Normal Dis	tribution Test				Lognormal D			
S	Shapiro Wilk Test Statistic	0.937			- 5	Shapiro Wilk	Test Statistic	0.903
	hapiro Wilk Critical Value	0.788					Critical Value	
Data appear Normal a	t 5% Significance Level	-		Data appea	ar Lognormal	at 5% Signif	ficance Level	-
Assuming Nor	mal Distribution			Ass	suming Logn	ormal Distrib		
	95% Student's-t UCL	15783				<u> </u>	95% H-UCL	
	sted for Skewness)	1.1000					(MVUE) UCL	
	ed-CLT UCL (Chen-1995)						(MVUE) UCL	
95% Modifi	ed-t UCL (Johnson-1978)	15/39			99%	Chebyshev	(MVUE) UCL	33368

Gamma Distribution Test		Data Distribution		
k star (bias corrected)		Data appear Normal at 5% Significance Level		
Theta Star				
MLE of Mean				
MLE of Standard Deviation				
nu star				
Approximate Chi Square Value (.05)		Nonparametric Statistics		
Adjusted Level of Significance		95% CLT UCL 1509		
Adjusted Chi Square Value	25.7	95% Jackknife UCL 1578		
		95% Standard Bootstrap UCL 1482		
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 1546		
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 1440		
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 1471		
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 1471		
Data appear Gamma Distributed at 5% Significance L	.evel	95% Chebyshev(Mean, Sd) UCL 2016		
		97.5% Chebyshev(Mean, Sd) UCL 2368		
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 3061		
95% Approximate Gamma UCL (Use when n >= 40)	17746			
95% Adjusted Gamma UCL (Use when n < 40)	20614			
Potential UCL to Use		Use 95% Student's-t UCL 1578		
Note: Suggestions regarding the selection of a 95%	UCL are p	rovided to help the user to select the most appropriate 95% UCL.		
		imulation studies summarized in Singh, Singh, and laci (2002)		
and Singh and Singh (2003). For	additional ir	sight, the user may want to consult a statistician.		
Note: For highly	negative-s	kewed data, confidence limits		
		rmal, and Gamma) may not be		
reliable. Ch	en's and Jo	hnson's methods provide		

NIC	General	Statistics
Number of Valid Observations		Number of Distinct Observations 6
	_	
Raw Statistics	<b>.</b>	Log-transformed Statistics
Minimum		Minimum of Log Data 2.04
Maximum		Maximum of Log Data 3.27
	17.08	Mean of log Data 2.72
Geometric Mean		SD of log Data 0.55
Median		
	7.98	
Std. Error of Mean		
Coefficient of Variation		
Skewness	-0.309	
Warning: A sample size of 'n' = 6 may not adequa	te enough to	compute meaningful and reliable test statistics and estimates!
Warning. / Coumple Size of IT = 6 may not adoqua	to chough to	ostripute meaningral and reliable test statistics and estimates:
		oservations using these statistical methods!
If possible compute and collect Data Qu	iality Object	ves (DQO) based sample size and analytical results.
Warning:	There are o	nly 6 Values in this data
		strap methods may be performed on this data set,
		e reliable enough to draw conclusions
*		<u> </u>
The literature suggests to use bootstr	ap methods	on data sets having more than 10-15 observations.
	Delevent I	CL Statistics
Normal Distribution Test	Relevant U	Lognormal Distribution Test
Shapiro Wilk Test Statistic	ი გგნ	Shapiro Wilk Test Statistic 0.83
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value 0.78
Data appear Normal at 5% Significance Level	0.700	Data appear Lognormal at 5% Significance Level
Bata appear from a at 0 % eignmeanes 20101		Data appear Logitorinar at 0 % digitilibation Lover
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	23.65	95% H-UCL 34.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 34.1
95% Adjusted-CLT UCL (Chen-1995)	22	97.5% Chebyshev (MVUE) UCL 41.4
95% Modified-t UCL (Johnson-1978)	23.58	99% Chebyshev (MVUE) UCL 55.7
,		
Gamma Distribution Test		Data Distribution
k star (bias corrected)		Data appear Normal at 5% Significance Level
Theta Star		
MLE of Mean	17.08	
MLE of Standard Deviation		
nu star		
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 22.4
Adjusted Chi Square Value	14.44	95% Jackknife UCL 23.6
	0.540	95% Standard Bootstrap UCL 21.9
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 23.6
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 20.7
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 21.8
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 21.4
Data appear Gamma Distributed at 5% Significance L	evei	95% Chebyshev(Mean, Sd) UCL 31.2 97.5% Chebyshev(Mean, Sd) UCL 37.4
Assuming Gamma Distribution		97.5% Chebyshev(Mean, Sd) UCL 37.4 99% Chebyshev(Mean, Sd) UCL 49.5
	28 UE	33 / Ochebyshev (Mean, 5d) UCL 49.5
95% Approximate Gamma UCL (Use when n >= 40)		
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)		Use 95% Student's-t UCI 23 6
95% Approximate Gamma UCL (Use when n >= 40)		Use 95% Student's-t UCL 23.6
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95%	34.01  UCL are pr	ovided to help the user to select the most appropriate 95% UCL.
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res	34.01  OUCL are produits of the s	ovided to help the user to select the most appropriate 95% UCL. mulation studies summarized in Singh, Singh, and laci (2002)
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the resand Singh and Singh (2003). For	34.01  5 UCL are produits of the sadditional in	ovided to help the user to select the most appropriate 95% UCL. mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For Note: For highly	34.01  5 UCL are produits of the sadditional in regative-sl	ovided to help the user to select the most appropriate 95% UCL. imulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For Note: For highly (e.g., Chen, John	34.01  5 UCL are produits of the sadditional in regative-slason, Lognor	ovided to help the user to select the most appropriate 95% UCL. mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.

OMIUM	General	Statistics
Number of Valid Observations		Number of Distinct Observations 6
	-	
Raw Statistics		Log-transformed Statistics
Minimum		Minimum of Log Data 1.88
Maximum		Maximum of Log Data 3.054
Mean		Mean of log Data 2.624
Geometric Mean		SD of log Data 0.424
Median		
	5.251	
Std. Error of Mean		
Coefficient of Variation		
Skewness	-0.573	
	•	o compute meaningful and reliable test statistics and estimates!
		ives (DQO) based sample size and analytical results.
ii possible compute and collect bata qu	idity Object	ves (based sample size and analytical results.
Warning:	There are o	nly 6 Values in this data
		strap methods may be performed on this data set,
		e reliable enough to draw conclusions
are resulting calculations	o may not be	Tollable chagh to draw contractions
The literature suggests to use bootstra	an methods	on data sets having more than 10-15 observations.
	-рош.ошо	5.1 data 5015 Having Hoto didn'to 15 5555.1 data.
	Relevant U	CL Statistics
Normal Distribution Test		Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.971	Shapiro Wilk Test Statistic 0.900
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value 0.78
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
		11 0
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	19.05	95% H-UCL 24.0
95% UCLs (Adjusted for Skewness)	1.0.00	95% Chebyshev (MVUE) UCL 26.09
95% Adjusted-CLT UCL (Chen-1995)	17.72	97.5% Chebyshev (MVUE) UCL 30.9
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL 40.4
Gamma Distribution Test		Data Distribution
k star (bias corrected)	3.961	Data appear Normal at 5% Significance Level
Theta Star		
MLE of Mean	14.73	
MLE of Standard Deviation	7.403	
nu star		
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 18.20
Adjusted Chi Square Value	28.34	95% Jackknife UCL 19.0
		95% Standard Bootstrap UCL 17.8
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 18.54
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 17.6
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 17.8
Kalara and Ondina and Ed. Onitia al Malara		95% BCA Bootstrap UCL 17.5
Kolmogorov-Smirnov 5% Critical Value		0F0/ Chabuahau/Maan Cd\ LICL 24.00
Noimogorov-Smirnov 5% Critical Value  Data appear Gamma Distributed at 5% Significance Lo	evel	
	evel	97.5% Chebyshev(Mean, Sd) UCL 28.12
Data appear Gamma Distributed at 5% Significance Lo Assuming Gamma Distribution		95% Chebyshev(Mean, Sd) UCL 24.08 97.5% Chebyshev(Mean, Sd) UCL 28.12 99% Chebyshev(Mean, Sd) UCL 36.06
Data appear Gamma Distributed at 5% Significance Logarity  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	21.41	97.5% Chebyshev(Mean, Sd) UCL 28.12
Data appear Gamma Distributed at 5% Significance Lo Assuming Gamma Distribution	21.41	97.5% Chebyshev(Mean, Sd) UCL 28.12
Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	21.41	97.5% Chebyshev(Mean, Sd) UCL 28.13 99% Chebyshev(Mean, Sd) UCL 36.00
Data appear Gamma Distributed at 5% Significance Logarity  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	21.41	97.5% Chebyshev(Mean, Sd) UCL 28.12
Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	21.41	97.5% Chebyshev(Mean, Sd) UCL 28.13 99% Chebyshev(Mean, Sd) UCL 36.00
Assuming Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95%	21.41 24.71 UCL are pr	97.5% Chebyshev(Mean, Sd) UCL 28.13 99% Chebyshev(Mean, Sd) UCL 36.00  Use 95% Student's-t UCL 19.00  Ovided to help the user to select the most appropriate 95% UCL.
Assuming Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95%  These recommendations are based upon the res	21.41 24.71 UCL are prults of the si	97.5% Chebyshev(Mean, Sd) UCL 28.13 99% Chebyshev(Mean, Sd) UCL 36.00  Use 95% Student's-t UCL 19.00  Ovided to help the user to select the most appropriate 95% UCL.  Imulation studies summarized in Singh, Singh, and laci (2002)
Assuming Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95%  These recommendations are based upon the res	21.41 24.71 UCL are prults of the si	97.5% Chebyshev(Mean, Sd) UCL 28.13 99% Chebyshev(Mean, Sd) UCL 36.00  Use 95% Student's-t UCL 19.00  Ovided to help the user to select the most appropriate 95% UCL.
Assuming Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95%  These recommendations are based upon the research and Singh and Singh (2003). For a Note: For highly	21.41 24.71 UCL are prults of the siadditional in	97.5% Chebyshev(Mean, Sd) UCL 28.12 99% Chebyshev(Mean, Sd) UCL 36.00  Use 95% Student's-t UCL 19.00  ovided to help the user to select the most appropriate 95% UCL. imulation studies summarized in Singh, Singh, and Iaci (2002) sight, the user may want to consult a statistician. kewed data, confidence limits
Assuming Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95%  These recommendations are based upon the res  and Singh and Singh (2003). For a  Note: For highly  (e.g., Chen, John	21.41 24.71  UCL are prults of the sign additional in regative-slason, Lognor	97.5% Chebyshev(Mean, Sd) UCL 28.13 99% Chebyshev(Mean, Sd) UCL 36.00  Use 95% Student's-t UCL 19.00  ovided to help the user to select the most appropriate 95% UCL. imulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.

N. J. W. P. O.	General Sta		
Number of Valid Observations	6	Number of Distinct Observations	6
Raw Statistics		Log-transformed Statistics	
Minimum	4.4	Minimum of Log Data	1.48
Maximum	29.9	Maximum of Log Data	
	16.45	Mean of log Data 2	
Geometric Mean		SD of log Data	0.68
Median			
	8.987		
Std. Error of Mean  Coefficient of Variation			
Skewness			
- OKEWHOOD	0.101	1	
Warning: A sample size of 'n' = 6 may not adequa	te enough to co	ompute meaningful and reliable test statistics and estimates!	
It is suggested to collect at lea	ast 8 to 10 obse	ervations using these statistical methods!	
If possible compute and collect Data Qu	uality Objectives	s (DQO) based sample size and analytical results.	
Worning	Thoro oro only	6 Values in this data	
		p methods may be performed on this data set,	
		eliable enough to draw conclusions	
the recularity calculation	o may not bo re	Masio chough to draw consideration	
The literature suggests to use bootstr	ap methods on	data sets having more than 10-15 observations.	
	Relevant UCL	Statistics	
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.78
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
According Normal Distribution		A	
Assuming Normal Distribution 95% Student's-t UCL	22.04	Assuming Lognormal Distribution  95% H-UCL	16 1
95% UCLs (Adjusted for Skewness)	23.04	95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)	22 74	97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)	23.88	99% Chebyshev (MVUE) UCL (	
(0000	1		
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.706	Data appear Normal at 5% Significance Level	
Theta Star	9.641		
MLE of Mean			
MLE of Standard Deviation			
nu star	20.48	Norman and Order	
Approximate Chi Square Value (.05)		Nonparametric Statistics	22.4
		95% CLT UCL 2 95% Jackknife UCL 2	
Adjusted Level of Significance	A A 3 ∕I	95% Standard Bootstrap UCL 2	
	8.834		
Adjusted Level of Significance Adjusted Chi Square Value		45% ROOTSTran-TILLII	
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic	0.255	95% Bootstrap-t UCL 2 95% Hall's Bootstrap UCL 2	
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	0.255 0.701	95% Hall's Bootstrap UCL 2	21.9
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic	0.255 0.701 0.235	95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 2	
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	0.255 0.701 0.235 0.334	95% Hall's Bootstrap UCL 2	22.1
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	0.255 0.701 0.235 0.334	95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 2 95% BCA Bootstrap UCL 2	22.1 32.4
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	0.255 0.701 0.235 0.334 evel	95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 2 95% BCA Bootstrap UCL 2 95% Chebyshev(Mean, Sd) UCL 3	22.1 32.4 39.3
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	0.255 0.701 0.235 0.334 evel	95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 2 95% BCA Bootstrap UCL 2 95% Chebyshev(Mean, Sd) UCL 3 97.5% Chebyshev(Mean, Sd) UCL 3	22.1 32.4 39.3
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	0.255 0.701 0.235 0.334 evel	95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 2 95% BCA Bootstrap UCL 2 95% Chebyshev(Mean, Sd) UCL 3 97.5% Chebyshev(Mean, Sd) UCL 3	22.1 32.4 39.3
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	0.255 0.701 0.235 0.334 evel	95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 2 95% BCA Bootstrap UCL 2 95% Chebyshev(Mean, Sd) UCL 3 97.5% Chebyshev(Mean, Sd) UCL 3	22.1 32.4 39.3 52.9
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	0.255 0.701 0.235 0.334 <b>evel</b> 30.07 38.13	95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 2 95% BCA Bootstrap UCL 2 95% Chebyshev(Mean, Sd) UCL 3 97.5% Chebyshev(Mean, Sd) UCL 3 99% Chebyshev(Mean, Sd) UCL 3	22. <sup>2</sup> 32. <sup>4</sup> 39. <sup>3</sup> 52. <sup>9</sup> 23.8

N .		
		Statistics
Number of Valid Observations	6	Number of Distinct Observations 6
		1
Raw Statistics	10000	Log-transformed Statistics
Minimum		Minimum of Log Data 9.729
Maximum		Maximum of Log Data 10.73
	31883	Mean of log Data 10.3
Geometric Mean		SD of log Data 0.414
Median		
	12034	
Std. Error of Mean		
Coefficient of Variation		
Skewness	-0.128	
Warning: A sample size of 'n' = 6 may not adequa	te enough to	compute meaningful and reliable test statistics and estimates!
It is suggested to collect at les	ot 0 to 10 ol	boon stions using those statistical mathedal
		bservations using these statistical methods! ives (DQO) based sample size and analytical results.
ii possible compute and collect Data Qu	iality Object	ves (DQO) based sample size and analytical results.
Warning	There ere e	nly 6 Values in this data
		strap methods may be performed on this data set,
		e reliable enough to draw conclusions
the resulting calculations	s may not be	reliable enough to draw conclusions
The literature consects to use heatety		an data acts having more than 10 15 chapmations
The literature suggests to use bootstra	ap metnous	on data sets having more than 10-15 observations.
	Relevant I I	CL Statistics
Normal Distribution Test	rtelevant o	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.91	Shapiro Wilk Test Statistic 0.899
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value 0.788
Data appear Normal at 5% Significance Level	0.766	Data appear Lognormal at 5% Significance Level
Data appear Normal at 5% Significance Level		Data appear Logitorniar at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	11702	95% H-UCL 51073
95% UCLs (Adjusted for Skewness)	41765	95% Chebyshev (MVUE) UCL 55558
95% OCLS (Adjusted for Skewitess) 95% Adjusted-CLT UCL (Chen-1995)	20600	97.5% Chebyshev (MVUE) UCL 65753
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL 85778
95 % Wodified-t OCL (Johnson-1976)	41740	99 % Cilebysilev (WIVOE) OCL  83778
Gamma Distribution Test		Data Distribution
k star (bias corrected)	2 017	Data appear Normal at 5% Significance Level
Theta Star		Data appear Normal at 5% Significance Level
MLE of Mean		
MLE of Standard Deviation		<del> </del>
nu star		Niama anno and On 10 10
A	122 27	Nonparametric Statistics
Approximate Chi Square Value (.05)		95% CLT UCL 39964
Adjusted Level of Significance	0.0122	
	0.0122	95% Jackknife UCL 41783
Adjusted Level of Significance Adjusted Chi Square Value	0.0122 27.93	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131
Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	0.0122 27.93 0.354	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic  Anderson-Darling 5% Critical Value	0.0122 27.93 0.354 0.698	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	0.0122 27.93 0.354 0.698 0.199	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	0.0122 27.93 0.354 0.698 0.199 0.333	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	0.0122 27.93 0.354 0.698 0.199 0.333	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	0.0122 27.93 0.354 0.698 0.199 0.333	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298 97.5% Chebyshev(Mean, Sd) UCL 62565
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	0.0122 27.93 0.354 0.698 0.199 0.333 evel	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	0.0122 27.93 0.354 0.698 0.199 0.333 evel	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298 97.5% Chebyshev(Mean, Sd) UCL 62565
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	0.0122 27.93 0.354 0.698 0.199 0.333 evel	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298 97.5% Chebyshev(Mean, Sd) UCL 62565
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	0.0122 27.93 0.354 0.698 0.199 0.333 evel	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298 97.5% Chebyshev(Mean, Sd) UCL 62565 99% Chebyshev(Mean, Sd) UCL 80766
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	0.0122 27.93 0.354 0.698 0.199 0.333 evel	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298 97.5% Chebyshev(Mean, Sd) UCL 62565
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use	0.0122 27.93 0.354 0.698 0.199 0.333 <b>evel</b> 46439 53648	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298 97.5% Chebyshev(Mean, Sd) UCL 62565 99% Chebyshev(Mean, Sd) UCL 80766
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95%	0.0122 27.93 0.354 0.698 0.199 0.333 evel 46439 53648	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298 97.5% Chebyshev(Mean, Sd) UCL 62565 99% Chebyshev(Mean, Sd) UCL 80766
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res	0.0122 27.93 0.354 0.698 0.199 0.333 evel 46439 53648	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298 97.5% Chebyshev(Mean, Sd) UCL 62565 99% Chebyshev(Mean, Sd) UCL 80766  Use 95% Student's-t UCL 41783  revided to help the user to select the most appropriate 95% UCL. imulation studies summarized in Singh, Singh, and laci (2002)
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For a	0.0122 27.93 0.354 0.698 0.199 0.333 evel 46439 53648	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298 97.5% Chebyshev(Mean, Sd) UCL 62565 99% Chebyshev(Mean, Sd) UCL 80766  Use 95% Student's-t UCL 41783  Covided to help the user to select the most appropriate 95% UCL. imulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For a	0.0122 27.93 0.354 0.698 0.199 0.333 evel 46439 53648	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298 97.5% Chebyshev(Mean, Sd) UCL 62565 99% Chebyshev(Mean, Sd) UCL 80766  Use 95% Student's-t UCL 41783  Crovided to help the user to select the most appropriate 95% UCL. Imulation studies summarized in Singh, Singh, and laci (2002) Isight, the user may want to consult a statistician.  Rewed data, confidence limits
Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For a Note: For highly (e.g., Chen, John	0.0122 27.93 0.354 0.698 0.199 0.333 evel 46439 53648	95% Jackknife UCL 41783 95% Standard Bootstrap UCL 39131 95% Bootstrap-t UCL 41090 95% Hall's Bootstrap UCL 39686 95% Percentile Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% BCA Bootstrap UCL 38933 95% Chebyshev(Mean, Sd) UCL 53298 97.5% Chebyshev(Mean, Sd) UCL 62565 99% Chebyshev(Mean, Sd) UCL 80766  Use 95% Student's-t UCL 41783  Tovided to help the user to select the most appropriate 95% UCL. imulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.

		Statistics
Number of Valid Observations	6	Number of Distinct Observations 6
Raw Statistics	404	Log-transformed Statistics
Minimum		Minimum of Log Data 4.64
Maximum		Maximum of Log Data 6.689
	489.7	Mean of log Data 6.025
Geometric Mean		SD of log Data 0.733
Median		
Std. Error of Mean	245.3	
Coefficient of Variation		
Skewness		
		compute meaningful and reliable test statistics and estimates!
It is suggested to collect at les	at 0 to 10 al	populations using those statistical mathedal
		pservations using these statistical methods!
ii possible compute and collect Data Qu	iality Objecti	ves (DQO) based sample size and analytical results.
Mouning	There are a	alv. 6 Valvias in this data
		nly 6 Values in this data
		trap methods may be performed on this data set,
the resulting calculations	s may not be	e reliable enough to draw conclusions
The literature suggests to use bootstra	ap methods	on data sets having more than 10-15 observations.
	Relevant U	CL Statistics
Normal Distribution Test		Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.976	Shapiro Wilk Test Statistic 0.838
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value 0.78
Data appear Normal at 5% Significance Level	•	Data appear Lognormal at 5% Significance Level
		11. 5
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	691.5	95% H-UCL 1581
95% UCLs (Adjusted for Skewness)	1001.0	95% Chebyshev (MVUE) UCL 1180
95% Adjusted-CLT UCL (Chen-1995)	633.0	97.5% Chebyshev (MVUE) UCL 1469
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL 2035
93 % Wodined-t OCE (301113011-1970)	000.5	33% Chebyshev (MVOL) OCL 2000
Gamma Distribution Test		Data Distribution
k star (bias corrected)	1 669	Data appear Normal at 5% Significance Level
Theta Star		Data appear Normal at 5% Significance Level
MLE of Mean		
MLE of Standard Deviation		
nu star		
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 654.
Adjusted Chi Square Value	8.535	95% Jackknife UCL 691.
		95% Standard Bootstrap UCL 639.
Anderson-Darling Test Statistic		95% Bootstrap-t UCL 678.0
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 671.8
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 644.
		95% BCA Bootstrap UCL 632.
Kolmogorov-Smirnov 5% Critical Value		95% Chebyshev(Mean, Sd) UCL 926.
	.evel	
	evel	
	evel	
Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	902.3	
Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	902.3	
Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	902.3	
Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	902.3	99% Chebyshev(Mean, Sd) UCL 1486
Assuming Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	902.3	99% Chebyshev(Mean, Sd) UCL 1486
Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use	902.3	99% Chebyshev(Mean, Sd) UCL 1486  Use 95% Student's-t UCL 691.
Assuming Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95%	902.3 1148	99% Chebyshev(Mean, Sd) UCL 1486  Use 95% Student's-t UCL 691.  ovided to help the user to select the most appropriate 95% UCL.
Assuming Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res	902.3 1148 5 UCL are produits of the si	99% Chebyshev(Mean, Sd) UCL 1486  Use 95% Student's-t UCL 691.  ovided to help the user to select the most appropriate 95% UCL.  mulation studies summarized in Singh, Singh, and laci (2002)
Assuming Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the res and Singh and Singh (2003). For	902.3 1148 5 UCL are produits of the siadditional in	Use 95% Student's-t UCL 691.  Ovided to help the user to select the most appropriate 95% UCL.  mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.
Assuming Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95% These recommendations are based upon the research and Singh and Singh (2003). For Note: For highly	902.3 1148 5 UCL are produits of the sign additional in regative-sl	99% Chebyshev(Mean, Sd) UCL 1486  Use 95% Student's-t UCL 691.  ovided to help the user to select the most appropriate 95% UCL. mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.  tewed data, confidence limits
Assuming Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)  Potential UCL to Use  Note: Suggestions regarding the selection of a 95%  These recommendations are based upon the res  and Singh and Singh (2003). For  Note: For highly  (e.g., Chen, Johr	902.3 1148 5 UCL are produits of the siadditional in regative-slason, Lognor	mulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.

PCB Removal Area

**Subsurface Soil** 

	Company LIOL Obsticutor for	- Data Cata	th New Detects	
User Selected Options	General UCL Statistics fo	r Data Sets Wi	In Non-Detects	
From File		Nowport\Doro	cktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - PCE	2 Domova
Full Precision	OFF	inewportibere	CKION (DIGIT I IIIGI MISK ASSESSITIETIK) EPOS (SUDSUTIACE SOII - POL	Nemova
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
Number of Bootstrap Operations	2000			
ENZO(A)ANTHRACENE				
		General Sta	atistics	
	Number of Valid Data	7	Number of Detected Data	(
Number	of Distinct Detected Data	6	Number of Non-Detect Data	
			Percent Non-Detects	14.299
Raw S	tatistics		Log-transformed Statistics	
	Minimum Detected	32.5	Minimum Detected	3.48
	Maximum Detected	252	Maximum Detected	5.52
	Mean of Detected	85.73	Mean of Detected	4.16
	SD of Detected	84.11	SD of Detected	0.76
	Minimum Non-Detect	360	Minimum Non-Detect	5.88
	Maximum Non-Detect	360	Maximum Non-Detect	5.88
	Warning: There	are only 6 De	tected Values in this data	
Note:			tottoa valaoo iii tillo aata	
14016.	it snould be noted that ev	en though boo	otstrap may be performed on this data set	
Hote.	the resulting calculations	en though boo may not be re	otstrap may be performed on this data set	
	the resulting calculations	may not be re	liable enough to draw conclusions	
	the resulting calculations	may not be re	otstrap may be performed on this data set cliable enough to draw conclusions eservations for accurate and meaningful results.	
	the resulting calculations	may not be re	eliable enough to draw conclusions eservations for accurate and meaningful results.	
It is recomm	the resulting calculations nended to have 10-15 or m	may not be re ore distinct ob UCL Stati	servations for accurate and meaningful results.	
It is recomm	the resulting calculations nended to have 10-15 or m	ore distinct ob	eliable enough to draw conclusions eservations for accurate and meaningful results.  istics  Lognormal Distribution Test with Detected Values Only	
It is recomm	the resulting calculations nended to have 10-15 or m with Detected Values Only Chapiro Wilk Test Statistic	ore distinct ob  UCL Stati	servations for accurate and meaningful results.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic	0.86
It is recomm  Normal Distribution Test  S  5% S	the resulting calculations nended to have 10-15 or m	ore distinct ob	eliable enough to draw conclusions eservations for accurate and meaningful results.  istics  Lognormal Distribution Test with Detected Values Only	0.86
Normal Distribution Test S  5% S  Data not Normal at 5	the resulting calculations nended to have 10-15 or medium with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value 5% Significance Level	ore distinct ob  UCL Stati	servations for accurate and meaningful results.  Issued to be a servations for accurate and meaningful results.  Issued to be a servation for accurate and m	0.86
Normal Distribution Test S  5% S  Data not Normal at 5  Assuming Nor	the resulting calculations nended to have 10-15 or medium with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value 5% Significance Level mal Distribution	ore distinct ob  UCL Stati	servations for accurate and meaningful results.  Issuming Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.86
Normal Distribution Test S  5% S  Data not Normal at 5  Assuming Nor	the resulting calculations nended to have 10-15 or media to have 10-	UCL Stati	servations for accurate and meaningful results.  istics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method	0.86 0.78
Normal Distribution Test S  5% S  Data not Normal at 5  Assuming Nor	with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value 5% Significance Level mal Distribution DL/2 Substitution Method Mean	UCL Stati 0.7 0.788	servations for accurate and meaningful results.  Statics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.86 0.78 4.3
Normal Distribution Test S  5% S  Data not Normal at 5  Assuming Nor	with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value 5% Significance Level mal Distribution DL/2 Substitution Method Mean SD	UCL Stati 0.7 0.788 99.2 84.65	servations for accurate and meaningful results.  Issues Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD	0.86 0.78 4.3 0.79
Normal Distribution Test  S  5% S  Data not Normal at 5  Assuming Nor	with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value 5% Significance Level mal Distribution DL/2 Substitution Method Mean	UCL Stati 0.7 0.788	servations for accurate and meaningful results.  Statics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.86 0.78 4.3 0.79
Normal Distribution Test S 5% S Data not Normal at 5 Assuming Nor	with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value 5% Significance Level mal Distribution DL/2 Substitution Method Mean SD	UCL Stati 0.7 0.788 99.2 84.65	servations for accurate and meaningful results.  Issues Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD	0.86
Normal Distribution Test S 5% S Data not Normal at 5 Assuming Nor	with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value 5% Significance Level mal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Stati 0.7 0.788  99.2 84.65 161.4	servations for accurate and meaningful results.  Servations for accurate and meaningful results.  Statics  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.86 0.78 4.3 0.79 286.
Normal Distribution Test S 5% S Data not Normal at 5 Assuming Nor	with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value SW Significance Level mal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Stati 0.7 0.788  99.2 84.65 161.4	servations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method	0.86 0.78 4.3 0.79 286.
Normal Distribution Test S 5% S Data not Normal at 5 Assuming Nor	with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value SW Significance Level mal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Stati 0.7 0.788  99.2 84.65 161.4	servations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	4.3 0.78 4.3 0.79 286. 4.16 0.69
Normal Distribution Test S 5% S Data not Normal at 5 Assuming Nor	with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value SW Significance Level mal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Stati 0.7 0.788  99.2 84.65 161.4	servations for accurate and meaningful results.  Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	4.3 0.78 4.3 0.79 286. 4.16 0.69 82.6
Normal Distribution Test S  5% S  Data not Normal at 5  Assuming Nor  Maximum Likelihoo	with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value SW Significance Level mal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Stati 0.7 0.788  99.2 84.65 161.4	Issuervations for accurate and meaningful results.  Issuervations for accurate and meaningful results.  Issuervations for accurate and meaningful results.  Issuervations for accurate and meaningful results.  Issuervations Control Statistic Shapiro Wilk Test Statistic Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD  SD  95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale	4.3 0.78 4.3 0.79 286. 4.16 0.69 82.6 77.2
Normal Distribution Test S  5% S  Data not Normal at 5  Assuming Nor  Maximum Likelihoo	with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value SW Significance Level mal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Stati 0.7 0.788  99.2 84.65 161.4	Isservations for accurate and meaningful results.  Isservations for accurate and meaningful results.  Issues Lognormal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL	4.3 0.78 4.3 0.79 286. 4.16 0.69 82.6 77.2
Normal Distribution Test S  5% S  Data not Normal at 5  Assuming Nor  Maximum Likelihoo	with Detected Values Only Shapiro Wilk Test Statistic hapiro Wilk Critical Value SW Significance Level mal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL	UCL Stati 0.7 0.788  99.2 84.65 161.4	Issuervations for accurate and meaningful results.  Issuervations for accurate and meaningful results.  Issuervations for accurate and meaningful results.  Issuervations for accurate and meaningful results.  Issuervations Control Statistic Shapiro Wilk Test Statistic Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD  SD  95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale	4.3 0.78 4.3 0.79 286. 4.16 0.69 82.6 77.2

BENZO(A)ANTHRACENE (Continued)				
Gamma Distribution Test with Detected Values Only	/	Data Distribution Test with Detected Values Only		
k star (bias corrected)	1.051	Data appear Gamma Distributed at 5% Significance Le	vel	
Theta Star	81.55			
nu star	12.62			
A-D Test Statistic	0.598	Nonparametric Statistics		
5% A-D Critical Value	0.705	Kaplan-Meier (KM) Method		
K-S Test Statistic	0.705	Mean	85.73	
5% K-S Critical Value	0.336	SD	76.79	
Data appear Gamma Distributed at 5% Significance Le	evel	SE of Mean	34.34	
		95% KM (t) UCL	152.5	
Assuming Gamma Distribution			142.2	
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	153.4	
Minimum	32.5	95% KM (bootstrap t) UCL	383.4	
Maximum	252	95% KM (BCA) UCL	146.1	
Mean	85.67	95% KM (Percentile Bootstrap) UCL	145.1	
Median	60.5	95% KM (Chebyshev) UCL	235.4	
SD	76.79	97.5% KM (Chebyshev) UCL	300.2	
k star	1.336	99% KM (Chebyshev) UCL	427.4	
Theta star	64.12			
Nu star	18.7	Potential UCLs to Use		
AppChi2	9.901	95% KM (BCA) UCL	146.1	
95% Gamma Approximate UCL (Use when n >= 40)	161.8			
95% Adjusted Gamma UCL (Use when n < 40)	199.2			
Note: DL/2 is not a recommended method.				
		ovided to help the user to select the most appropriate 95% UCL	•	
These recommendations are based upon the result	s of the sim	ulation studies summarized in Singh, Maichle, and Lee (2006).		
For additional insight	t, the user m	nay want to consult a statistician.		

General Statistics		
Number of Valid Data 7	Number of Detected Data	
Number of Distinct Detected Data 6	Number of Non-Detect Data	440
	Percent Non-Detects	14.2
	formed Statistics	
Minimum Detected 18.9	Minimum Detected	2.
Maximum Detected 172  Mean of Detected 62.07	Maximum Detected  Mean of Detected	5. 3.
Mean of Detected 62.07 SD of Detected 59.07	SD of Detected	0
Minimum Non-Detect 360	Minimum Non-Detect	5
Maximum Non-Detect 360	Maximum Non-Detect	5
Warning: There are only 6 Detected Values in this data  Note: It should be noted that even though bootstrap may be performed on this	e data est	
the resulting calculations may not be reliable enough to draw conclusion		
It is recommended to have 10-15 or more distinct observations for accurate and mea	aningful results.	
UCL Statistics	Fest with Detected Values Only	
al Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic 0.774  Lognormal Distribution T	Shapiro Wilk Test Statistic	<b>y</b> 0
	6 Shapiro Wilk Critical Value	
	nal at 5% Significance Level	
Assuming Normal Distribution Assuming Log	gnormal Distribution	
DL/2 Substitution Method	DL/2 Substitution Method	
Mean 78.91	Mean	4
SD 69.96	SD	(
95% DL/2 (t) UCL 130.3	95% H-Stat (DL/2) UCL	3
Maximum Likelihood Estimate(MLE) Method N/A	Log ROS Method	
MLE method failed to converge properly	Mean in Log Scale SD in Log Scale	3
	Mean in Original Scale	5
	SD in Original Scale	
	95% t UCL	ç
95°	% Percentile Bootstrap UCL	
	95% BCA Bootstrap UCL	1
	95% H-UCL	1
na Distribution Test with Detected Values Only  Data Distribution Test	t with Detected Values Only	
	tributed at 5% Significance Lev	/el
Theta Star 63.79		
nu star 11.68		
	metric Statistics	
	Kaplan-Meier (KM) Method	
K-S Test Statistic 0.706 5% K-S Critical Value 0.337	Mean SD	(
pear Gamma Distributed at 5% Significance Level	SE of Mean	- 2
danima Distributed at 5 % digrimicance Level	95% KM (t) UCL	
Assuming Gamma Distribution	95% KM (z) UCL	-
imma ROS Statistics using Extrapolated Data	95% KM (jackknife) UCL	-
Minimum 18.9	95% KM (bootstrap t) UCL	3
Maximum 172	95% KM (BCA) UCL	
	(Percentile Bootstrap) UCL	
Median 38.3	95% KM (Chebyshev) UCL	
	97.5% KM (Chebyshev) UCL	2
k star 1.232	99% KM (Chebyshev) UCL	
Theta star         50.25           Nu star         17.24         Potentia	al IICI a ta II-a	
	95% KM (Chebyshev) UCL	
AnnChi2 9 9.47	30 /0 Kivi (Gliebysilev) UCL	
amma Approximate UCL (Use when n >= 40) 120.6		

	General S	Statistics	
Number of Valid Data	7	Number of Detected Data	
Number of Distinct Detected Data	6	Number of Non-Detect Data	
		Percent Non-Detects	14.29°
Raw Statistics		Log-transformed Statistics	
Minimum Detected	26.6	Minimum Detected	3.28
Maximum Detected	336	Maximum Detected	5.8
Mean of Detected	109	Mean of Detected	4.2
SD of Detected	119.8	SD of Detected	0.9
Minimum Non-Detect	360	Minimum Non-Detect	5.8
Maximum Non-Detect	360	Maximum Non-Detect	5.8
Note: It should be noted that ev	en though b	Detected Values in this data ootstrap may be performed on this data set	
-	•	reliable enough to draw conclusions	
It is recommended to have 10-15 or m		observations for accurate and meaningful results.	
Normal Distribution Test with Detected Values Only	UCL St	atistics  Lognormal Distribution Test with Detected Values Only	7
Shapiro Wilk Test Statistic	0.746	Shapiro Wilk Test Statistic	0.90
5% Shapiro Wilk Critical Value	0.740	5% Shapiro Wilk Critical Value	0.78
Data not Normal at 5% Significance Level	0.700	Data appear Lognormal at 5% Significance Level	0.71
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	119.1	Mean	4.4
SD	112.6	SD	0.
95% DL/2 (t) UCL	201.8	95% H-Stat (DL/2) UCL	491
33 % DE12 (t) GOE	201.0	33 % TI-Otat (DE/2) OOL	731
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly	1071	Mean in Log Scale	4.:
MEE Moulou landa to donvoigo propony		SD in Log Scale	0.8
		Mean in Original Scale	103
		SD in Original Scale	110
		95% t UCL	184
		95% Percentile Bootstrap UCL	171
		95% BCA Bootstrap UCL	205
		95% H-UCL	344
Gamma Distribution Test with Detected Values Only	,	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.776	Data appear Gamma Distributed at 5% Significance Leve	el
Theta Star	140.4	Buttu appour dumina Biotributou de 070 digimiodrico E010	<u>.                                    </u>
nu star	9.31		
A-D Test Statistic	0.517	Nonparametric Statistics	
5% A-D Critical Value	0.71	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.71	Mean	1
5% K-S Critical Value	0.339	SD	109
Data appear Gamma Distributed at 5% Significance Le	vel	SE of Mean	48.
		95% KM (t) UCL	2
Assuming Gamma Distribution		95% KM (z) UCL	189
		95% KM (jackknife) UCL	205
Gamma ROS Statistics using Extrapolated Data	00.0	95% KM (bootstrap t) UCL	762
Gamma ROS Statistics using Extrapolated Data  Minimum	26.6	050/ 1/14 (DOA) 1101	191
Ŭ ,	336	95% KM (BCA) UCL	
Minimum		95% KM (BCA) UCL 95% KM (Percentile Bootstrap) UCL	189
Minimum Maximum	336		
Minimum Maximum Mean	336 107.8	95% KM (Percentile Bootstrap) UCL	189
Minimum Maximum Mean Median SD k star	336 107.8 57.9 109.4 0.969	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL	189 322
Minimum Maximum Mean Median SD k star Theta star	336 107.8 57.9 109.4 0.969 111.2	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL	189 322 414
Minimum Maximum Mean Median SD k star	336 107.8 57.9 109.4 0.969 111.2 13.57	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use	189 322 414 599
Minimum Maximum Mean Median SD k star Theta star Nu star AppChi2	336 107.8 57.9 109.4 0.969 111.2 13.57 6.277	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL	189 321 414 599
Minimum Maximum Mean Median SD k star Theta star Nu star AppChi2 95% Gamma Approximate UCL (Use when n >= 40)	336 107.8 57.9 109.4 0.969 111.2 13.57 6.277 233	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use	189 322 414
Minimum  Maximum  Median  SD  k star  Theta star  Nu star  AppChi2  95% Gamma Approximate UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	336 107.8 57.9 109.4 0.969 111.2 13.57 6.277	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use	189 321 414 599
Minimum  Maximum  Median  SD  k star  Theta star  Nu star  AppChi2  95% Gamma Approximate UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	336 107.8 57.9 109.4 0.969 111.2 13.57 6.277 233 300.8	95% KM (Percentile Bootstrap) UCL 95% KM (Chebyshev) UCL 97.5% KM (Chebyshev) UCL 99% KM (Chebyshev) UCL Potential UCLs to Use	18 32 41 59

	General Stati	stics	
Number of Valid Data	6	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	3
		Percent Non-Detects	50.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	7.48	Minimum Detected	2.012
Maximum Detected	43.7	Maximum Detected	3.777
Mean of Detected	19.69	Mean of Detected	2.618
SD of Detected	20.79	SD of Detected	1.004
Minimum Non-Detect	3.83	Minimum Non-Detect	1.343
Maximum Non-Detect	360	Maximum Non-Detect	5.886
   Note: Data have multiple DLs - Use of KM Method is recommen	hah	Number treated as Non-Detect	6
For all methods (except KM, DL/2, and ROS Methods),	ucu	Number treated as Non-Detect  Number treated as Detected	(
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
		tected Values in this data set	
The number of detected data may not be add	equate enough t	o perform GOF tests, bootstrap, and ROS methods.	
Those methods will	return a 'N/A' va	alue on your output display!	
		t Values for bootstrap methods.	
		stinct values may not be reliable. or accurate and meaningful results and estimates.	
it is recommended to have 10 to 15 or more	e observations t	or accurate and meaningful results and estimates.	
	UCL Statist		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Onl	
Shapiro Wilk Test Statistic	0.758	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic	0.773
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value		Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.773
Shapiro Wilk Test Statistic	0.758	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic	
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.758	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.773
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value  Data not Normal at 5% Significance Level	0.758	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level	0.773 0.767
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution	0.758 0.767 40.49	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	0.773 0.767 2.394
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method	0.758 0.767	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method	0.773 0.767 2.394 1.79
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method Mean	0.758 0.767 40.49	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean	0.773 0.767 2.394 1.79
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean SD 95% DL/2 (t) UCL	0.758 0.767 40.49 70.14 98.19	Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL	0.773 0.767 2.394 1.79
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.758 0.767 40.49 70.14	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method	0.773 0.767 2.394 1.79 13998
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean SD 95% DL/2 (t) UCL	0.758 0.767 40.49 70.14 98.19	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale	0.773 0.767 2.394 1.79 13998
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.758 0.767 40.49 70.14 98.19	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale	0.773 0.767 2.394 1.79 13998 1.493 1.517
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.758 0.767 40.49 70.14 98.19	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale	2.394 1.79 1.493 1.517 10.86
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.758 0.767 40.49 70.14 98.19	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale	2.394 1.79 13998 1.493 1.517 10.86 16.38
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.758 0.767 40.49 70.14 98.19	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale 95% t UCL	2.394 1.79 13998 1.493 1.517 10.86 16.38 24.33
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.758 0.767 40.49 70.14 98.19	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale SD in Log Scale SD in Original Scale SD in Original Scale 95% t UCL  95% Percentile Bootstrap UCL	2.394 1.79 13998 1.493 1.517 10.86 16.38 24.33 23.44
Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% DL/2 (t) UCL  Maximum Likelihood Estimate(MLE) Method	0.758 0.767 40.49 70.14 98.19	Lognormal Distribution Test with Detected Values Onl Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean SD 95% H-Stat (DL/2) UCL  Log ROS Method Mean in Log Scale SD in Log Scale Mean in Original Scale SD in Original Scale 95% t UCL	2.394 1.79 13998 1.493 1.517 10.86 16.38 24.33

DIBENZO(A,H)ANTHRACENE (Continued)				
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only		
k star (bias corrected) N/A		Data appear Lognormal at 5% Significance Level		
Theta Star	N/A	., •		
nu star	N/A			
A-D Test Statistic	N/A	Nonparametric Statistics		
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method		
K-S Test Statistic	N/A	Mean	14.81	
5% K-S Critical Value	N/A	SD	14.45	
Data not Gamma Distributed at 5% Significance Leve	el	SE of Mean	7.913	
		95% KM (t) UCL	30.75	
Assuming Gamma Distribution		95% KM (z) UCL	27.82	
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	29.58	
Minimum	N/A	95% KM (bootstrap t) UCL	690.1	
Maximum	N/A	95% KM (BCA) UCL	43.7	
Mean	N/A	95% KM (Percentile Bootstrap) UCL	43.7	
Median	N/A	95% KM (Chebyshev) UCL	49.3	
SD	N/A	97.5% KM (Chebyshev) UCL	64.23	
k star	N/A	99% KM (Chebyshev) UCL	93.54	
Theta star	N/A			
Nu star	N/A	Potential UCLs to Use		
AppChi2	N/A	95% KM (BCA) UCL	43.7	
95% Gamma Approximate UCL (Use when n >= 40)	N/A			
95% Adjusted Gamma UCL (Use when n < 40)	N/A			
Note: DL/2 is not a recommended method.				
		ovided to help the user to select the most appropriate 95% UCL.		
These recommendations are based upon the result	s of the sim	ulation studies summarized in Singh, Maichle, and Lee (2006).		
For additional insight	, the user m	ay want to consult a statistician.		

	General UCL Statistics f	or Full Data	Sets		
User Selected Options					
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - PCB Remo				
Full Precision	OFF				
Confidence Coefficient	95%	5%			
Number of Bootstrap Operations	2000				
ALUMINUM					
		0	Ohadishisa		
Nive	har of Valid Observations		Statistics  Number of Distinct Observations	<u></u>	
Num	ber of Valid Observations	ь	Number of Distinct Observations	ь	
Day 6	Statistics		Log-transformed Statistics		
Raw	Minimum	2100	Log-transformed Statistics  Minimum of Log Data	7 607	
	Maximum		Maximum of Log Data  Maximum of Log Data	7.007	
		11338	Mean of log Data		
	Geometric Mean		SD of log Data	0.763	
	Median	5745			
	Std. Error of Mean				
	Coefficient of Variation				
	Skewness	-0.233			
Worning: A comple size	of 'n' = 6 may not adeque	to onough to	compute meaningful and reliable test statistics and estimates!		
warning. A sample size	or ir – o may not adequa	te enough to	compute meaningful and reliable test statistics and estimates:		
ما با	suggested to collect at lea	at 0 to 10 ah	servations using these statistical methods!		
			ves (DQO) based sample size and analytical results.		
ii possible coi	inpute and collect Data Qu	ianty Objecti	ves (DQO) based sample size and analytical results.		
	Worning	Thoro oro or	nly 6 Values in this data		
Note: It o	hould be noted that even t	hough boots	trap methods may be performed on this data set,		
Note. It s	the resulting calculation	s may not be	reliable enough to draw conclusions		
	ure resulting calculations	s may not be	reliable ellougit to draw collousions		
The literatur	re cuaneete to use hootetr	an methode	on data sets having more than 10-15 observations.		
The literatur	e auggesia io uae nooisii	ap memous (	on data sets having more than 10-13 observations.		
		Relevant I I	CL Statistics		
Normal Dis	stribution Test	i velevalit U	Lognormal Distribution Test		
	Shapiro Wilk Test Statistic	n 937	Shapiro Wilk Test Statistic	n 701	
	Shapiro Wilk Critical Value		Shapiro Wilk Test Statistic		
	at 5% Significance Level	0.700	Data appear Lognormal at 5% Significance Level	0.700	
Data appear Norman	at 0 /0 Oiginicance Level		Data appear Lognormal at 570 dignificance Level		

Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	16065	95% H-UCL 40027
95% UCLs (Adjusted for Skewness)	!	95% Chebyshev (MVUE) UCL 28207
95% Adjusted-CLT UCL (Chen-1995)	14958	97.5% Chebyshev (MVUE) UCL 35218
95% Modified-t UCL (Johnson-1978)	16027	99% Chebyshev (MVUE) UCL 48989
Gamma Distribution Test		Data Distribution
k star (bias corrected)	1.596	Data appear Normal at 5% Significance Level
Theta Star	7105	
MLE of Mean	11338	
MLE of Standard Deviation	8975	
nu star	19.15	
Approximate Chi Square Value (.05)	10.23	Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 15196
Adjusted Chi Square Value		95% Jackknife UCL 16065
· · · · · · · · · · · · · · · · · · ·		95% Standard Bootstrap UCL 14878
Anderson-Darling Test Statistic	0.573	95% Bootstrap-t UCL 15406
Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 15718
Kolmogorov-Smirnov Test Statistic	0.27	95% Percentile Bootstrap UCL 14867
Kolmogorov-Smirnov 5% Critical Value	0.335	95% BCA Bootstrap UCL 14425
Data appear Gamma Distributed at 5% Significance L	evel	95% Chebyshev(Mean, Sd) UCL 21562
		97.5% Chebyshev(Mean, Sd) UCL 25986
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 34676
95% Approximate Gamma UCL (Use when n >= 40)	21231	
95% Adjusted Gamma UCL (Use when n < 40)	27200	
Potential UCL to Use		Use 95% Student's-t UCL 16065
Note: Suggestions regarding the selection of a 95%	UCL are p	rovided to help the user to select the most appropriate 95% UCL.
		imulation studies summarized in Singh, Singh, and laci (2002)
and Singh and Singh (2003). For	additional ir	sight, the user may want to consult a statistician.
N . =		
		kewed data, confidence limits
		rmal, and Gamma) may not be
		hnson's methods provide vely skewed data sets.

	General S			
Number of Valid Observations	7	Number of Distinct Observations	7	
Raw Statistics		Log-transformed Statistics		
Minimum	1.47	Minimum of Log Data 0.38		
Maximum		Maximum of Log Data		
Mean		Mean of log Data		
Geometric Mean	11.43	SD of log Data		
Median				
	14.38			
Std. Error of Mean				
Coefficient of Variation				
Skewness	2.037			
It is suggested to collect at lea	st 8 to 10 obs	compute meaningful and reliable test statistics and estimates! ervations using these statistical methods! es (DQO) based sample size and analytical results.		
		y 7 Values in this data		
		rap methods may be performed on this data set, reliable enough to draw conclusions		
The literature suggests to use bootstr.	ap methods or	n data sets having more than 10-15 observations.		
The morature baggoote to dee booten				
Normal Distribution Test	Relevant UC	L Statistics Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.736	Lognormal Distribution Test Shapiro Wilk Test Statistic	በ ያን	
Shapiro Wilk Test Statistic		Shapiro Wilk Critical Value 0.803		
Data not Normal at 5% Significance Level	0.000	Data appear Lognormal at 5% Significance Level	5.00	
Assuming Normal Distribution	100.00	Assuming Lognormal Distribution	0-	
95% Student's-t UCL	26.86	95% H-UCL		
95% UCLs (Adjusted for Skewness)	20 71	95% Chebyshev (MVUE) UCL		
95% Adjusted-CLT UCL (Chen-1995) 95% Modified-t UCL (Johnson-1978)		97.5% Chebyshev (MVUE) UCL 99% Chebyshev (MVUE) UCL		
95 % Modified-t OCE (Johnson-1978)	27.50	99 % Chebyshev (MVOE) OCL	00. I	
Gamma Distribution Test		Data Distribution		
	0.985	Data appear Gamma Distributed at 5% Significance Le	evel	
k star (bias corrected)				
Theta Star				
Theta Star MLE of Mean	16.3			
Theta Star MLE of Mean MLE of Standard Deviation	16.3 16.42			
Theta Star MLE of Mean MLE of Standard Deviation nu star	16.3 16.42 13.78	N		
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05)	16.3 16.42 13.78 6.423	Nonparametric Statistics	25.2	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance	16.3 16.42 13.78 6.423 0.0158	95% CLT UCL		
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05)	16.3 16.42 13.78 6.423 0.0158	95% CLT UCL 95% Jackknife UCL	26.8	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	16.3 16.42 13.78 6.423 0.0158 4.988	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL	26.8 24.6	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	16.3 16.42 13.78 6.423 0.0158 4.988	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL	26.8 24.6 39.6	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	16.3 16.42 13.78 6.423 0.0158 4.988 0.651 0.721	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL	26.8 24.6 39.6 73.1	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	16.3 16.42 13.78 6.423 0.0158 4.988 0.651 0.721	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	26.8 24.6 39.6 73.1 26.0	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	16.3 16.42 13.78 6.423 0.0158 4.988 0.651 0.721 0.288 0.317	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL	26.8 24.6 39.6 73.1 26.0 28.9	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	16.3 16.42 13.78 6.423 0.0158 4.988 0.651 0.721 0.288 0.317	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL	26.8 24.6 39.6 73.1 26.0 28.9 39.9	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	16.3 16.42 13.78 6.423 0.0158 4.988 0.651 0.721 0.288 0.317	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL	26.8 24.6 39.6 73.1 26.0 28.9 39.9 50.2	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	16.3 16.42 13.78 6.423 0.0158 4.988 0.651 0.721 0.288 0.317 evel	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	26.8 24.6 39.6 73.1 26.0 28.9 39.9 50.2	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	16.3 16.42 13.78 6.423 0.0158 4.988 0.651 0.721 0.288 0.317 evel	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	26.8 24.6 39.6 73.1 26.0 28.9 39.9 50.2	
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value  Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution 95% Approximate Gamma UCL (Use when n >= 40)	16.3 16.42 13.78 6.423 0.0158 4.988 0.651 0.721 0.288 0.317 evel	95% CLT UCL 95% Jackknife UCL 95% Standard Bootstrap UCL 95% Bootstrap-t UCL 95% Hall's Bootstrap UCL 95% Percentile Bootstrap UCL 95% BCA Bootstrap UCL 95% Chebyshev(Mean, Sd) UCL 97.5% Chebyshev(Mean, Sd) UCL	26.8 24.6 39.6 73.1 26.0 28.9 39.9 50.2 70.3	

OMIUM				
	General	Statistics		
Number of Valid Observations		Number of Distinct Observations	7	
	<u>.                                    </u>			
Raw Statistics		Log-transformed Statistics		
Minimum		Minimum of Log Data		
Maximum		Maximum of Log Data		
Mean Geometric Mean		Mean of log Data SD of log Data		
Geometric Median Median		SD of log Data	1.151	
	7.688			
Std. Error of Mean				
Coefficient of Variation				
Skewness	-0.0569			
		compute meaningful and reliable test statistics and estimates!		
If possible compute and collect Data Qu	ality Object	bservations using these statistical methods! ives (DQO) based sample size and analytical results. nly 7 Values in this data		
Note: It should be noted that even t	hough boots	strap methods may be performed on this data set,		
the resulting calculations	s may not b	e reliable enough to draw conclusions		
The literature suggests to use bootstra	ap methods	on data sets having more than 10-15 observations.		
		·		
	Relevant U	CL Statistics		
Normal Distribution Test	0.076	Lognormal Distribution Test		
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic		
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.803	
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level		
Assuming Normal Distribution		Assuming Lognormal Distribution		
95% Student's-t UCL	19.06	95% H-UCL	131 1	
95% UCLs (Adjusted for Skewness)	10.00	95% Chebyshev (MVUE) UCL		
95% Adjusted-CLT UCL (Chen-1995)	18.13	97.5% Chebyshev (MVUE) UCL		
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL		
Gamma Distribution Test	T	Data Distribution		
k star (bias corrected)		Data appear Normal at 5% Significance Level		
Theta Star				
MLE of Mean MLE of Standard Deviation				
MLE of Standard Deviation nu star				
Approximate Chi Square Value (.05)		Nonparametric Statistics		
Approximate crit square value (.03)  Adjusted Level of Significance		95% CLT UCL	18.19	
Adjusted Chi Square Value		95% Jackknife UCL		
.,		95% Standard Bootstrap UCL		
Anderson-Darling Test Statistic	0.663	95% Bootstrap-t UCL		
Anderson-Darling 5% Critical Value	0.719	95% Hall's Bootstrap UCL	19.29	
Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL		
Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL		
Data follow Appr. Gamma Distribution at 5% Significance	e Level	95% Chebyshev(Mean, Sd) UCL		
A		97.5% Chebyshev(Mean, Sd) UCL		
Assuming Gamma Distribution	07.07	99% Chebyshev(Mean, Sd) UCL	42.33	
95% Approximate Gamma UCL (Use when n >= 40) 95% Adjusted Gamma UCL (Use when n < 40)				
33 /0 Aujusteu Gaitilla OCL (USE WITER N < 40)	JJ.40			
Potential UCL to Use	I .	Use 95% Student's-t UCL	19.06	
		35 55 % 5.55 5.55		
These recommendations are based upon the res	ults of the s	rovided to help the user to select the most appropriate 95% UCL imulation studies summarized in Singh, Singh, and laci (2002) sight, the user may want to consult a statistician.		
	nogetive o	kowad data, confidence limite		
Note: For highly		kewed data, confidence limits		
Note: For highly (e.g., Chen, Johr	nson, Logno	kewed data, confidence limits rmal, and Gamma) may not be hnson's methods provide		

	General St	atistics	
Number of Valid Observations	6	Number of Distinct Observations 6	3
Raw Statistics		Log-transformed Statistics	
Minimum		Minimum of Log Data 0	
Maximum		Maximum of Log Data 3	3.178
Mean		Mean of log Data 2	
Geometric Mean		SD of log Data 1	1.028
Median			
	7.67		
Std. Error of Mean			
Coefficient of Variation			
Skewness	0.143		
		ompute meaningful and reliable test statistics and estimates!	
		ervations using these statistical methods!	
If possible compute and collect Data Qu	ality Objective:	s (DQO) based sample size and analytical results.	
		6 Values in this data	
		p methods may be performed on this data set,	
the resulting calculations	s may not be re	eliable enough to draw conclusions	
The literature suggests to use bootstra	ap methods on	data sets having more than 10-15 observations.	
	Relevant UCL		
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic 0	
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value 0	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	18 73	95% H-UCL 1	100 6
95% UCLs (Adjusted for Skewness)	10.75	95% Chebyshev (MVUE) UCL 3	
95% Adjusted-CLT UCL (Chen-1995)	17 77	97.5% Chebyshev (MVUE) UCL 5	
95% Modified-t UCL (Johnson-1978)		99% Chebyshev (MVUE) UCL 7	
oo w meanica t ooz (comicon 1070)	10.70	00% 01100y0110* (111*02) 002 7	1.0
Gamma Distribution Test		Data Distribution	
	1 039	Data appear Normal at 5% Significance Level	
k star (blas corrected)		Buta appear Normal at 0 % Significance Ecver	
k star (bias corrected) Theta Star			
Theta Star			
Theta Star MLE of Mean	12.42		
Theta Star MLE of Mean MLE of Standard Deviation	12.42 12.19		
Theta Star MLE of Mean MLE of Standard Deviation nu star	12.42 12.19 12.47	Nonnarametric Statistics	
Theta Star  MLE of Mean  MLE of Standard Deviation  nu star  Approximate Chi Square Value (.05)	12.42 12.19 12.47 5.537	Nonparametric Statistics	17.5
Theta Star  MLE of Mean  MLE of Standard Deviation  nu star  Approximate Chi Square Value (.05)  Adjusted Level of Significance	12.42 12.19 12.47 5.537 0.0122	95% CLT UCL 1	
Theta Star  MLE of Mean  MLE of Standard Deviation  nu star  Approximate Chi Square Value (.05)	12.42 12.19 12.47 5.537 0.0122	95% CLT UCL 1 95% Jackknife UCL 1	18.73
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value	12.42 12.19 12.47 5.537 0.0122 3.992	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1	18.73 17.06
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic	12.42 12.19 12.47 5.537 0.0122 3.992 0.404	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1	18.73 17.06 19.68
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value	12.42 12.19 12.47 5.537 0.0122 3.992 0.404 0.705	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 2	18.73 17.06 19.68 21.99
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	12.42 12.19 12.47 5.537 0.0122 3.992 0.404 0.705 0.255	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 1	18.73 17.06 19.68 21.99 17.38
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value	12.42 12.19 12.47 5.537 0.0122 3.992 0.404 0.705 0.255	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1	18.73 17.06 19.68 21.99 17.38
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic	12.42 12.19 12.47 5.537 0.0122 3.992 0.404 0.705 0.255	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2	18.73 17.06 19.68 21.99 17.38 17.12 26.03
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L	12.42 12.19 12.47 5.537 0.0122 3.992 0.404 0.705 0.255	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 3	18.73 17.06 19.68 21.99 17.38 17.12 26.03
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	12.42 12.19 12.47 5.537 0.0122 3.992 0.404 0.705 0.255 0.336 evel	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2	18.73 17.06 19.68 21.99 17.38 17.12 26.03
Theta Star  MLE of Mean  MLE of Standard Deviation  nu star  Approximate Chi Square Value (.05)  Adjusted Level of Significance  Adjusted Chi Square Value  Anderson-Darling Test Statistic  Anderson-Darling 5% Critical Value  Kolmogorov-Smirnov Test Statistic  Kolmogorov-Smirnov 5% Critical Value  Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	12.42 12.19 12.47 5.537 0.0122 3.992 0.404 0.705 0.255 0.336 evel	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 3	18.73 17.06 19.68 21.99 17.38 17.12 26.03
Theta Star MLE of Mean MLE of Standard Deviation nu star Approximate Chi Square Value (.05) Adjusted Level of Significance Adjusted Chi Square Value Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution	12.42 12.19 12.47 5.537 0.0122 3.992 0.404 0.705 0.255 0.336 evel	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 3	18.73 17.06 19.68 21.99 17.38 17.12 26.03
Theta Star  MLE of Mean  MLE of Standard Deviation  nu star  Approximate Chi Square Value (.05)  Adjusted Level of Significance  Adjusted Chi Square Value  Anderson-Darling Test Statistic  Anderson-Darling 5% Critical Value  Kolmogorov-Smirnov Test Statistic  Kolmogorov-Smirnov 5% Critical Value  Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	12.42 12.19 12.47 5.537 0.0122 3.992 0.404 0.705 0.255 0.336 evel	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 3	18.73 17.06 19.68 21.99 17.38 17.12 26.03 31.98
Theta Star  MLE of Mean  MLE of Standard Deviation  nu star  Approximate Chi Square Value (.05)  Adjusted Level of Significance  Adjusted Chi Square Value  Anderson-Darling Test Statistic  Anderson-Darling 5% Critical Value  Kolmogorov-Smirnov Test Statistic  Kolmogorov-Smirnov 5% Critical Value  Data appear Gamma Distributed at 5% Significance L  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	12.42 12.19 12.47 5.537 0.0122 3.992 0.404 0.705 0.255 0.336 evel	95% CLT UCL 1 95% Jackknife UCL 1 95% Standard Bootstrap UCL 1 95% Bootstrap-t UCL 1 95% Hall's Bootstrap UCL 2 95% Percentile Bootstrap UCL 1 95% BCA Bootstrap UCL 1 95% Chebyshev(Mean, Sd) UCL 2 97.5% Chebyshev(Mean, Sd) UCL 3 99% Chebyshev(Mean, Sd) UCL 4	18.73 17.06 19.68 21.99 17.38 17.12 26.03 31.98

General St	atistics		
Number of Valid Observations 6	Number of Distinct Observations 6		
Raw Statistics	Log-transformed Statistics		
Minimum 6800	Minimum of Log Data 8.82		
Maximum 43600	Maximum of Log Data 10.66		
Mean 27150	Mean of log Data 10.0		
Geometric Mean 23572	SD of log Data 0.66		
Median 27250			
SD 12755			
Std. Error of Mean 5207			
Coefficient of Variation 0.47			
Skewness -0.495			
Warning: A sample size of 'n' = 6 may not adequate enough to co	ompute meaningful and reliable test statistics and estimates!		
It is suggested to collect at least 8 to 10 obse If possible compute and collect Data Quality Objective Warning: There are only	s (DQO) based sample size and analytical results.  6 Values in this data		
Note: It should be noted that even though bootstra			
the resulting calculations may not be re	eliable enough to draw conclusions		
The literature suggests to use bootstrap methods on	data sets having more than 10-15 observations.		
	<u> </u>		
Relevant UCL	Statistics		
Normal Distribution Test	Lognormal Distribution Test		
Shapiro Wilk Test Statistic 0.976	Shapiro Wilk Test Statistic 0.84		
Shapiro Wilk Critical Value 0.788	Shapiro Wilk Critical Value 0.78		
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level		
Accuraing Normal Distribution	Assuming Lagranmal Distribution		
Assuming Normal Distribution  95% Student's-t UCL 37643	Assuming Lognormal Distribution  95% H-UCL 7225		
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL 6105		
95% Adjusted-CLT UCL (Chen-1995) 34590	97.5% Chebyshev (MVUE) UCL 7530		
95% Modified-t UCL (Johnson-1978) 37467	99% Chebyshev (MVUE) UCL 1032		
(30.00000000000000000000000000000000000	0070 011001 (1111 027 002   1002		
Gamma Distribution Test	Data Distribution		
k star (bias corrected) 1.959	Data appear Normal at 5% Significance Level		
Theta Star 13857			
MLE of Mean 27150			
MLE of Standard Deviation 19397			
nu star 23.51			
Approximate Chi Square Value (.05) 13.48	Nonparametric Statistics		
Adjusted Level of Significance 0.0122	95% CLT UCL 3571		
Adjusted Chi Square Value 10.84	95% Jackknife UCL 3764		
Anderson Dedicate Control 0 000	95% Standard Bootstrap UCL 3520		
Anderson-Darling Test Statistic 0.388	95% Bootstrap-t UCL 3672		
Anderson-Darling 5% Critical Value 0.7 Kolmogorov-Smirnov Test Statistic 0.252	95% Hall's Bootstrap UCL 3550 95% Percentile Bootstrap UCL 3533		
Kolmogorov-Smirnov 1est Statistic 0.252  Kolmogorov-Smirnov 5% Critical Value 0.334	95% BCA Bootstrap UCL 3386		
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL 4984		
Sate appear Gamma Distributed at 0 /0 Orginilicance Level	97.5% Chebyshev(Mean, Sd) UCL 5966		
Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL 7896		
95% Approximate Gamma UCL (Use when n >= 40) 47363	22.2 2.22,2.24,000,001,001,001		
95% Adjusted Gamma UCL (Use when n < 40) 58901			
` ' '			
Potential UCL to Use	Use 95% Student's-t UCL 3764		
Note: Suggestions regarding the selection of a 95% UCL are provi			
These recommendations are based upon the results of the simu			
and Singh and Singh (2003). For additional insig	ht, the user may want to consult a statistician.		
Note: For highly and address above	ved data, confidence limits		
NUIE. FUL DIUDIA DEUSTING-ERON	TOU GUEL SOUTHWIND THE TOU		
(e.g., Chen, Johnson, Lognorma reliable. Chen's and Johns	al, and Gamma) may not be		

	General	Statistics
Number of Valid Observations	6	Number of Distinct Observations 6
Daw Obalistics		London and Charletine
Raw Statistics Minimum	205	Log-transformed Statistics  Minimum of Log Data 5.72
Maximum		Maximum of Log Data 3.72  Maximum of Log Data 7.082
	520.3	Mean of log Data 6.132
Geometric Mean		SD of log Data 0.495
Median		32 31 10g 2 414 01 103
	334.9	
Std. Error of Mean		
Coefficient of Variation		
Skewness	2.236	
Warning: A sample size of 'n' = 6 may not adequa	te enough to	o compute meaningful and reliable test statistics and estimates!
		oservations using these statistical methods!
If possible compute and collect Data Qu	uality Objecti	ves (DQO) based sample size and analytical results.
		nly 6 Values in this data
		strap methods may be performed on this data set,
the resulting calculation	s may not be	e reliable enough to draw conclusions
The literature suggests to use bootstr	ap methods	on data sets having more than 10-15 observations.
	Delevent II	Ol Chalistics
Normal Distribution Test	Relevant U	CL Statistics Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.679	Shapiro Wilk Test Statistic 0.802
Shapiro Wilk Critical Value		Shapiro Wilk Test Statistic 0.802
Data not Normal at 5% Significance Level	0.700	Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
95% Student's-t UCL	795.8	95% H-UCL 931.4
95% UCLs (Adjusted for Skewness)	1	95% Chebyshev (MVUE) UCL 957.5
95% Adjusted-CLT UCL (Chen-1995)	878.6	97.5% Chebyshev (MVUE) UCL 1151
95% Modified-t UCL (Johnson-1978)	816.6	99% Chebyshev (MVUE) UCL 1532
	•	
Gamma Distribution Test		Data Distribution
k star (bias corrected)		Data Follow Appr. Gamma Distribution at 5% Significance Leve
Theta Star	232.9	
MLE of Mean		
MLE of Standard Deviation		
nu star		
Approximate Chi Square Value (.05)		Nonparametric Statistics
Adjusted Level of Significance		95% CLT UCL 745.2
Adjusted Chi Square Value	13.09	95% Jackknife UCL 795.8
Anderson Darling Test Ct-ti-ti-	0.767	95% Standard Bootstrap UCL 725.5
Anderson-Darling Test Statistic Anderson-Darling 5% Critical Value		95% Bootstrap-t UCL 1729 95% Hall's Bootstrap UCL 1678
Anderson-Daning 5% Critical Value		95% Percentile Bootstrap UCL 776.8
		95% BCA Bootstrap UCL 817.7
Kolmogorov-Smirnov Test Statistic	10.000	95% BCA Bootstrap OCE 817.7 95% Chebyshev(Mean, Sd) UCL 1116
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value		97.5% Chebyshev(Mean, Sd) UCL 1110
Kolmogorov-Smirnov Test Statistic		
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance		
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance Assuming Gamma Distribution	e Level	99% Chebyshev(Mean, Sd) UCL 1881
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance	<b>e Level</b> 871.6	
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)  95% Adjusted Gamma UCL (Use when n < 40)	<b>e Level</b> 871.6	99% Chebyshev(Mean, Sd) UCL 1881
Kolmogorov-Smirnov Test Statistic Kolmogorov-Smirnov 5% Critical Value Data follow Appr. Gamma Distribution at 5% Significance  Assuming Gamma Distribution  95% Approximate Gamma UCL (Use when n >= 40)	<b>e Level</b> 871.6	

# **APPENDIX F.4**

**SAMPLE CALCULATIONS** 

CLIENT:	<u>-</u>	JOB NUMBER:				
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND						
SUBJECT:						
CALCULATION OF INTAKE/RISK I	CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL					
CONSTRUCTION WORKERS	CONSTRUCTION WORKERS					
BASED ON:	BASED ON:					
USEPA, DECEMBER 1989						
BY:	CHECKED BY:	DATE:				
R. JUPIN	L. Cufani	9/14/2012				

**PURPOSE:** To estimate intake, carcinogenic and noncarcinogenic risks from incidental ingestion of

subsurface soil at the PCB removal area.

EQUATION: IEX = CS x IR x EF x ED x FI x CF
BW x AT

Where:

IEX = estimated exposure intake (mg/kg/day)
Cs = exposure point concentration in soil (mg/kg)

IR = incidental ingestion rate (mg/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)

FI = fraction ingested from contaminated source (unitless)

CF = conversion factor (1E-06 kg/mg)

BW = body weight (kg) AT = averaging time (days)

CSFo = oral carcinogenic slope factor ((mg/kg/day)<sup>-1</sup>) RfDo = oral noncarcinogenic reference dose (mg/kg/day)

**RISKS:** 

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)-1 HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

#### **ASSUMPTIONS:**

7.10001111		<u></u>		
Cs	=	35	mg/kg	Chemical: Arsenic
<b>IR</b>	=	330	mg/day	
EF	=	130	days/year	
ED	=	1	years	
FI	=	1		
CF	=	1E-06	kg/mg	
BW	=	70	kg	
ATc	=	25,550	days	
ATnc	=	365	days	
CSFo	=	1.5E+00	(mg/kg/da	y) <sup>-1</sup>
RfDo	=	3.0E-04	(mg/kg/da	y)

## Page 2 of 2

CLIENT:	JOB NUMBER:	
NAVSTA NEWPORT, NEWPORT,	RHODE ISLAND	112G02747
SUBJECT:	-	
CALCULATION OF INTAKE/RISK I	FROM INCIDENTAL IN	IGESTION OF SOIL
CONSTRUCTION WORKERS		
BASED ON:		
USEPA, DECEMBER 1989		
BY:	CHĘCKED BY:	DATE:
R. JUPIN	L. Cufami	9/14/2012

## **EXAMPLE CARCINOGENIC CALCULATION**

IEXc = 35 mg/kg x 330 mg/day x 130 days/year x 1 years x 1 x 1E-06 kg/mg 70 kg x 25550 days

IEXc = 8.40E-07 mg/kg/day

ILCR = 8.40E-07 mg/kg/day x 1.50E+00 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 1.3E-06

## **EXAMPLE NONCARCINOGENIC CALCULATION**

IEXnc = 35 mg/kg x 330 mg/day x 130 days/year x 1 years x 1 x 1E-06 kg/mg
70 kg x 365 days

IEXnc = 5.88E-05 mg/kg/day

HQ = 5.88E-05 mg/kg/day / 3.00E-04 (mg/kg/day) = Hazard Quotient

HQ = 2.0E-01

CLIENT:	JOB NUMBER:			
NAVSTA NEWPORT, NEWPORT, RH	IODE ISLAND	112G02747		
SUBJECT:		•		
CALCULATION OF INTAKE/RISK FR	OM DERMAL CONTACT WITH SO	DIL		
CONSTRUCTION WORKERS				
BASED ON:		•**		
USEPA, JULY 2004				
BY:	CHECKED BY:	DATE:		
R. JUPIN 2 Carpan 9/14/2012				

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with

subsurface soil at the PCB removal area.

EQUATION: DEX =  $\frac{\text{Cs x CF x SA x AF x ABS x EF x ED}}{\text{BW x AT}}$ 

Where:

DEX = estimated exposure intake (mg/kg/day)
Cs = exposure point concentration in soil (mg/kg)

CF = conversion factor (1E-06 kg/mg)

SA = skin surface available for contact (cm2/day)

ABS = absorption factor (unitless)

AF = adherence factor (mg/cm2)

EF = exposure frequency (days/year)

ED = exposure duration (years)

BW = body weight (kg)
AT = averaging time (days)

CSFd = dermal carcinogenic slope factor ((mg/kg/day)<sup>-1</sup>) RfDd = dermal noncarcinogenic reference dose (mg/kg/day)

#### **RISKS:**

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFd (mg/kg/day)-1 HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDd (mg/kg/day)

### **ASSUMPTIONS:**

=	 35	mg/kg	Chemical: Arsenic
=	1E-06	kg/mg	
=	3,300	cm <sup>2</sup> /day	
=	0.3	mg/cm <sup>2</sup>	
=	0.03		
=	130	days/year	
=	1	years	
=	70	kg	
=	25,550	days	
=	365	days	
=	1.5E+00	(mg/kg/day	y) <sup>-1</sup>
=	3.0E-04	(mg/kg/day	<b>y</b> )
	= = = = = = = = = = = = = = = = = = = =	= 1E-06 = 3,300 = 0.3 = 0.03 = 130 = 1 = 70 = 25,550 = 365 = 1.5E+00	= 1E-06 kg/mg = 3,300 cm²/day = 0.3 mg/cm² = 0.03 = 130 days/year = 1 years = 70 kg = 25,550 days = 365 days = 1.5E+00 (mg/kg/day

CLIENT:	JOB NUMBER:				
NAVSTA NEWPORT, NEWPORT, R	NAVSTA NEWPORT, NEWPORT, RHODE ISLAND				
SUBJECT:					
CALCULATION OF INTAKE/RISK FF	ROM DERMAL CONTACT W	/ITH SOIL			
CONSTRUCTION WORKERS					
BASED ON:	BASED ON:				
USEPA, JULY 2004					
BY:	CHECKED BY:	DATE:			
R. JUPIN	9/14/2012				
· · · · · · · · · · · · · · · · · · ·					

## **EXAMPLE CARCINOGENIC CALCULATION**

DEXc = 35 mg/kg x 1E-06 kg/mg x 3300 cm2/day x 0.3 mg/cm2 x 0.03 x 130 days/year x 1 years 70 kg x 25550 days

DEXc = 7.56E-08 mg/kg/day

ILCR = 7.56E-08 mg/kg/day x 1.50E+00 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 1.1E-07

### **EXAMPLE NONCARCINOGENIC CALCULATION**

DEXnc = 35 mg/kg x 1E-06 kg/mg x 3300 cm2/day x 0.3 mg/cm2 x 0.03 x 130 days/year x 1 years 70 kg x 365 days

DEXnc = 5.29E-06 mg/kg/day

HQ = 5.29E-06 mg/kg/day / 3.00E-04 (mg/kg/day) = Hazard Quotient

HQ = 1.8E-02

CLIENT:	JOB NUMBER:				
NAVSTA NEWPORT, NEWPOR	T, RHODE ISLAND	112G02747			
SUBJECT:					
CALCULATION OF INTAKE/RIS	K FROM INHALATION OF FÜG	ATIVE DUST EMISSIONS	ľ		
CONSTRUCTION WORKERS					
BASED ON:	BASED ON:				
USEPA, JANUARY 2009		- 1212 11 12 11			
BY: CHECKED BY: DATE:					
R. JUPIN 2 Cirpani 9/14/2012					
<del></del>		·			

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of subsurface soil at the PCB removal area.

EC = Ca x ET x EF x ED **EQUATION:** AT x 24 hours/day

Where:

EC = exposure concentration (mg/m3)

Ca = exposure point concentration in air (mg/m3)

= Cs x 1/PEF

= exposure point concentration in soil (mg/kg) Cs

PEF = particulate emission factor (m3/kg)

= exposure time (hrs/day) EΤ

= exposure frequency (days/year) EF

ED = exposure duration (years)

BW = body weight (kg)

= averaging time (hours) ΑT **IUR** 

= inhalation unit risk ((ug/m3)<sup>-1</sup>)

= inhalation reference concentration (mg/m3) RfC

#### **RISKS:**

ILCR (Carcinogens) = Exposure Concentration (mg/m3) x IURi (ug/m3)-1 x 1000 ug/mg HQ (Noncarcinogens) = Exposure Concentration (mg/m3) / RFCi (mg/m3)

## **ASSUMPTIONS:**

Cs	=	35	mg/kg	Chemical: Arsenic
PEF	=	1.40E+06	m3/kg	
Ca	=	2.50E-05	mg/m3	
ET	=	8	hours/day	
EF	=	130	days/year	
ED	=	1	years	
ATc	=	25,550	days	
ATnc	=	365	days	
IUR	=	4.3E-03	(ug/m3) <sup>-1</sup>	
RfC	=	1.5E-05	(mg/m3)	

# Page 2 of 2

CLIENT:	:					JOB NUMBER:	
NAVSTA	TA NEWPORT, NEWPORT, RHODE ISLAND			112G02747			
SUBJEC	T:				-		
CALCUL	ATI(	ON OF INTA	AKE/RISK F	FROM INHALATION C	OF FUGATIVE	E DUST EMISSIONS	
CONSTR	RUC	TION WOR	KERS				
BASED	ON:						
USEPA,	JAN	<b>UARY 2009</b>	9				
BY:				CHECKED BY:		DATE:	
R. JUPIN	١			1 I Cuf	e	9/14/2012	
		<del></del>		U			
EXAMPL	LE C	ARCINOGE	ENIC CALC	CULATION			
IEXc	=		2.50E-05 n	ng/m3 x 8 hours/day >	c 130 davs/ve	ar x 1 vears	
12/10				25550 days x 24			
IEXc	=	4.24E-08	mg/m3				
IL/(O			9				
ILCR	=	4.24F-08 r	na/m3 x 4.3	30E-03 (ug/m3)-1 x 10	100 ua/ma = li	ncremental Lifetime Cancer	Risk
12011				(ag/e/ /	gg		
ILCR	=	1.8E-07					
FXAMPI	LE N	ONCARCII	NOGENIC C	CALCULATION			
IEXnc	=		2.50E-05 r	ng/m3 x 8 hours/day x	k 130 davs/ve	ar x 1 vears	
ILANO	_		2.002 00 .	365 days x 24 h			
				ooo dayo x 2 i ii	ou. o, uu,		
IEXnc	=	2.97E-06	mg/m3				
ILAIIC	_	2.31 L-00	mg/mo				
HQ	=	2 97F-06 r	ma/m3 / 1 5	0E-05 (mg/m3) = Haz	ard Quotient		
i iQ	_	2.31 L-00 I	ng/mo / 1.5	or oo (mg/mo/ = maz	ara gaotient		
HQ		2.0E-01					
1100		Z.UL-U I					

CLIENT:	JOB NUI	MBER:		
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND	112G027	<u>'47</u>		
SUBJECT:				
CALCULATION OF PARTICUALATE EMISSION FACTOR FOR CONSTRUCTION WORKERS				
BASED ON:				
Supplemental Guidance for Developing Soil Screening Le	evels for Superfund Site	s (USEPA, December 2002)		
BY:	CHECKED BY:	DATE:		
R. JUPIN	Lester	9/14/2012		

Equation 5-5 Derivation of the Particulate Emission Factor Construction Scenario - Construction Worker  $PEF_{sc} = Q/C_{sr} \times \frac{1}{F_D} \times$ Parameter/Definition (units) Default PEF<sub>w</sub>/subchronic road particulate emission factor (m³/kg) site-specific Q/C<sub>e</sub>/ inverse of the ratio of the 1-h geometric mean air 23.024 concentration to the emission flux along a straight road (Equation 5-6) segment bisecting a square site (g/m²-s per kg/m³) 0.185 F<sub>c</sub>/dispersion correction factor (unitiess) (Appendix E) T/total time over which construction occurs (s) site-specific A<sub>s</sub>/surface area of contaminated road segment (m<sup>2</sup>) 274.213  $\times W_n \times 0.092903 \text{m}^2/\text{ft}^2$ ) L<sub>e</sub>/length of road segment (ft) W\_/width of road segment (ft) W/mean vehicle weight (tons) site-specific p/number of days with at least 0.01 inches of precipitation site-specific (days/year) (Exhibit 5-2) ΣVKT/sum of fleet vehicle kilometers traveled during the exposure site-specific duration (km) Assumes a 0.5 acre site

## **Calculation of PEF for Construction Workers**

Q/C	23.02 (g/m²-s pe	er kg/m³)		
Fd	0.185 dispersion	dispersion correction factor (unitless)		
T	3.74E+06 sec	3600 sec/hr x 8hr/day x 130 days/yr		
$A_R$	274.213 m²			
W	8 tons			
p	135 day/year			
VKT	175.5 km	30 vehicles x 0.045 km/day x 130 days		

 $PEF = 1.40E + 06 \text{ m}^3/\text{kg}$ 

CLIENT:	JOB NUMBER:			
NAVSTA NEWPORT, NEWPORT, RHODE	SLAND	112G02747		
SUBJECT:				
CALCULATION OF THE PARTICULATE EM	IISSION FACTOR (PEF) FOR			
RESIDENTIAL AND COMMERCIAL/INDUST	TRIAL EXPOSURES			
BASED ON: SUPPLEMENTAL GUIDANC	BASED ON: SUPPLEMENTAL GUIDANCE FOR DEVELOPING SOIL SCREENING LEVELS			
FOR SUPERFUND SITES (USEPA, DECEMBER, 2002)				
BY:	CHECKED BY:	DATE:		
R. JUPIN	J. Cufai	9/14/2012		

**PURPOSE:** To calculate the particulate emission factor for residential and commercial/industrial exposure scenarios.

## **EQUATIONS:**

PEF = Q/C<sub>wind</sub> x 
$$\frac{3600 \text{ sec/hr}}{0.036 \text{ x (1 - V) x (Um/Ut)}^3 \text{ x F(x)}}$$

$$Q/C_{wind} = A \times exp \left[ \frac{(\ln A_{site} - B)^2}{C} \right]$$

Where:

PEF = particulate emission factor  $(m^3/kg)$ 

 $Q/C_{wind}$  = Inverse of mean conc. at center of source (g/m<sup>2</sup>-s per kg/m<sup>3</sup>).

V = fraction of vegetative cover (unitless) $<math>U_m = mean annual windspeed (m/sec)$ 

U<sub>t</sub> = equivalent threshold value of windspeed at 7m (m/sec)

F(x) = function dependent on Um/Ut derived using Cowherd et al. (1985) (unitless) A,B,C = constants based on air dispersion modeling for specific climate zones

A<sub>site</sub> = areal extent of the site or contamination (acres)

#### **ASSUMPTIONS:**

		<del></del>		
V	=	0.5	unitless	
$U_{m}$	=	3.84	m/sec	Values are for Hartford, Connecticut.
Ut	=	11.32	m/sec	
F(x)	=	0.0345	unitless	
Α	=	12.5907	unitless	
В	=	18.8368	unitless	
С	=	215.4377	unitless	
$A_{\text{site}}$	=	0.5	acres	

CLIENT:	JO	B NUMBER:		
NAVSTA NEWPORT, NEWPOR	T, RHODE ISLAND 112	2G02747		
SUBJECT:				
CALCULATION OF THE PARTIC	CULATE EMISSION FACTOR (PEF)	FOR		
RESIDENTIAL AND COMMERC	IAL/INDUSTRIAL EXPOSURES			
BASED ON: SUPPLEMENTAL	GUIDANCE FOR DEVELOPING SC	DIL SCREENING LEVELS		
FOR SUPERFUND SITES (USEPA, DECEMBER, 2002)				
BY:	CHECKED BY:	DATE:		
R. JUPIN	J. Cinfron	<del>~</del> 9/14/2012		

# EXAMPLE CALCULATION FOR Q/Cwind

 $Q/C_{wind} = 12.5907 \text{ x exp}[(ln(0.5) - 18.8368)^2 / 215.4377]$ 

 $Q/C_{wind} = 73.95045 \text{ g/m}2\text{-s per kg/m}3$ 

## **EXAMPLE CALCULATION FOR PEF**

PEF = 73.95045 g/m2-s per kg/m3 x 3600 sec/hr

0.036 x (1 - 0.5) x (3.84 m/sec/11.32 m/sec)^3 x 0.0345

 $PEF = 1.10E+10 \text{ m}^3/\text{kg}$ 

CLIENT:		JOB NUMBER:		
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		112G02747		
SUBJECT:				
CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER				
CHILD RESIDENTS				
BASED ON:				
USEPA, DECEMBER 1989				
BY:	CHECKED BY:	DATE:		
R. JUPIN	1 L Cinfo	9/14/2012		

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from ingestion of

groundwater at former Building 234.

EQUATION:  $IEX = \frac{Cgw \times CF \times IR \times EF \times ED}{BW \times AT}$ 

Where:

IEX = estimated exposure intake (mg/kg/day)

Cgw = exposure point concentration in groundwater (ug/L)

CF = conversion factor (1.0E-3 mg/ug)

IR = ingestion rate (L/day)

EF = exposure frequency (days/year) ED = exposure duration (years)

BW = body weight (kg) AT = averaging time (days)

CSFo = oral carcinogenic slope factor ((mg/kg/day)<sup>-1</sup>) RfDo = oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)-1 HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

**ASSUMPTIONS:** 

3.9 ug/L Chemical: Trichloroethene Cgw IR 1.4 L/day CF 1.0E-03 mg/ug = = 350 days/year EF ED = 6 years BW 15 kg = 25,550 days ATc = 2,190 days ATnc = CSFo = 5.9E-03 (mg/kg/day)<sup>-1</sup> (mg/kg/day) RfDo NA

# Page 2 of 2

## **CALCULATION WORKSHEET**

CLIENT:		JOB NUMBER:		
NAVSTA NEWPORT, NEWPORT, R	112G02747			
SUBJECT:	\ <u>-</u>			
CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER				
CHILD RESIDENTS				
BASED ON:				
USEPA, DECEMBER 1989				
BY:	CHECKED BY:	DATE:		
R. JUPIN	L'afra	9/14/2012		

### **EXAMPLE CARCINOGENIC CALCULATION**

IEXc = 3.9 ug/L x 0.001 mg/ug x 1.4 L/day x 350 days/year x 6 years 15 kg x 25550 days

IEXc = 2.99E-05 mg/kg/day

ILCR = 2.99E-05 mg/kg/day x 5.90E-03 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 1.8E-07

### **EXAMPLE NONCARCINOGENIC CALCULATION**

IEXnc = 3.9 ug/L x 0.001 mg/ug x 1.4 L/day x 350 days/year x 6 years 15 kg x 2190 days

IEXnc = 3.49E-04 mg/kg/day

**HQ** = No reference dose is available for trichloroethene.

## Page 1 of 3

CLIENT:

NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

SUBJECT:

CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER
CHILD RESIDENTS

BASED ON:

USEPA, DECEMBER 1989, JULY 2004

BY:

R. JUPIN

CHECKED BY:

9/14/2012

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with

groundwater at former Building 234.

DAD = DAevent x EV x ED x EF x A
BW x AT

Where:

DAD = dermally absorbed dose (mg/kg/day)
DAevent = absorbed dose per event (mg/cm²/event)

EV = event frequency (events/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)

A = skin surface available for contact (cm<sup>2</sup>)

BW = body weight (kg) AT = averaging time (days)

CSFd = dermal carcinogenic slope factor ((mg/kg/day)<sup>-1</sup>) RfDd = dermal noncarcinogenic reference dose (mg/kg/day)

**RISKS:** 

ILCR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)-1 HQ (Noncarcinogens) = DAD (mg/kg/day) / RFDd (mg/kg/day)

## **EQUATIONS** for DAevent:

For Inorganics:

DAevent = Kp x Cw x CF x tevent

For Organics:

If tevent  $\leq$  t', then: DAevent=  $2 \times FA \times Kp \times Cw \times CF \times \sqrt{\frac{6 \times tau \times tevent}{\pi}}$ 

If tevent > t, then: DAevent=  $FA \times Kp \times Cw \times CF \times \left[ \frac{tevent}{1+B} + 2 \times tau \times \left( \frac{1+3B+3B^2}{(1+B)^2} \right) \right]$ 

CLIENT:	JOB NUMBER:				
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND 112G02747					
SUBJECT:					
CALCULATION OF INTAKE/RISK FRO	M DERMAL CONTACT WITH	I GROUNDWATER			
CHILD RESIDENTS	CHILD RESIDENTS				
BASED ON:					
USEPA, DECEMBER 1989, JULY 2004					
BY:	CHECKED BY:	DATE:			
R. JUPIN	L. Coffee	9/14/2012			

Where:

Kp = permeability coefficient from water (cm/hr)

Cgw = concentration of chemical in groundwater (mg/L)

tevent = duration of event (hr/event)

CF = conversion factor (0.001 L/cm³)

t\* = time it takes to reach steady-state (hr/event)

 $\tau$  = lag time (hr/event)

B = Bunge Model Constant (dimensionless)

# **EXAMPLE CALCULATION OF DAevent**

# **ASSUMPTIONS:**

Cgw	=	0.0039	mg/L	Chemical: Trichloroethene
Кр	=	1.16E-02	cm/hr	
FA	=	1	unitless	
tevent	=	1	hr/event	
CF	=	0.001	L/cm <sup>3</sup>	
t*	=	1.39	hr/event	
τ	=	0.58	hr/event	
R	=	0.051		

## tevent < t\*, therefore,

DAevent =  $(2 \times 0.0116 \text{ cm/hr}) (1) (0.0039 \text{ mg/L}) (0.001 \text{ L/cm3}) \times$ 

6 x 0.58 hr/event x 1 hr/event π

DAevent =  $9.52E-08 \text{ mg/cm}^2$ -event

# **RISK CALCULATIONS**

=	6.600	cm <sup>2</sup>
=		event/day
=	6	years
=	350	days/year
=	15	kg
=	25,550	days
=	2,190	days
=	5.9E-03	(mg/kg/day) <sup>-1</sup>
=	NA	(mg/kg/day)
	= = = =	= 1 = 6 = 350 = 15 = 25,550 = 2,190 = 5.9E-03

CLIENT: JOB NUMBER: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND 112G02747 SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER CHILD RESIDENTS BASED ON: USEPA, DECEMBER 1989, JULY 2004 CHECKED BY: DATE: BY: 9/14/2012 R. JUPIN I. Cust **EXAMPLE CARCINOGENIC CALCULATION** DADc 9.52E-08 mg/cm2-event x 1 event/day x 6 years x 350 days/year x 6600 cm2 15 kg x 25550 days DADc = 3.44E-06mg/kg/day DADc = 3.44E-06 mg/kg/day x 5.90E-03 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk ILCR = 2.0E-08**EXAMPLE NONCARCINOGENIC CALCULATION** 9.52E-08 mg/cm2-event x 1 event/day x 6 years x 350 days/year x 6600 cm2 DADnc 15 kg x 2190 days DADnc = 4.02E-05mg/kg/day = No reference dose is available for trichloroethene. HQ

CLIENT:
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
SUBJECT:
ESTIMATION OF AMBIENT AIR CONCENTRATIONS IN A TRENCH RESULTING FROM VOLATILE EMISSIONS FROM GROUNDWATER.
BASED ON:
VDEQ, 2004
BY:
CHECKED BY:
R. JUPIN

JOB NUMBER:

112G02747

112G02747

STORM FROM VOLATILE EMISSIONS
FROM GROUNDWATER.

DATE:
9/14/2012

PURPOSE:

To calculate ambient air concentrations resulting from volatilization of TCE

from groundwater at former Building 234.

Ctrench = CGW x VF

Where:

Ctrench = concentration of contaminant in the trench μg/m<sup>3</sup>
CGW = concentration of contaminant in groundwater μg/L
VF = volatilization factor L/m<sup>3</sup>

## 1. Calculate kiG (gas-phase mass transfer coefficient of component i)

 $kiG = (MWH2O/MWi)^{0.335} \times (T/298)^{1.005} \times kG, H2O$ 

Where:

kiG = gas-phase mass transfer coefficient of component i cm/s

MW<sub>H2O</sub> = molecular weight of water =

18 g/mol

MW<sub>TCF</sub> = molecular weight of TCE =

131.39 g/mol

kG,H2O = gas-phase mass transfer coefficient of water vapor at 25°C cm/s =

0.833 cm/s

T = average system absolute temperature =

298

The value of kG, H<sub>2</sub>O is 0.833 cm/s (Superfund Exposure Assessment Manual, U. S. EPA, April 1988)

 $kiG = (18/131.39)^{0.335} x (298/298)^{1.005} x 0.833 cm/s = 4.28E-01 cm/s$ 

## 2. Calculate kil. (liquid-phase mass transfer coefficient of component i)

 $kiL = (MWO_2/MWi)^{0.5} x (T/298) x kL, O_2$ 

Where:

kiL = liquid-phase mass transfer coefficient of component i cm/s

 $MW_{O2}$  = molecular weight of  $O_2$  =

32 g/mol

MW<sub>TCF</sub> = molecular weight of TCE =

131.39 g/mol

T = average system absolute temperature =

298

kL, O<sub>2</sub> = liquid-phase mass transfer coefficient of oxygen at 25°C cm/s =

0.002 cm/s

 $kiL = (32/131.39)^{0.5} x (298/298) x 0.002 cm/s =$ 

9.87E-04 cm/s

CLIENT:		JOB NUMBER:
NAVSTA NEWPORT, NEWPORT, RHODE IS	LAND	112G02747
SUBJECT:		
ESTIMATION OF AMBIENT AIR CONCENTR	ATIONS IN A TRENCH	RESULTING FROM VOLATILE EMISSIONS
FROM GROUNDWATER.		
BASED ON:	-	
VDEQ, 2004		
BY:	CHECKED BY:	DATE:
R. JUPIN	J. Cuy	9/14/2012

## 3. Calculate Ki (overall mass transfer coefficient of contaminant)

 $Ki = 1 / \{(1/kiL) + [(RT) / (Hi \times kiG)]\}$ 

Where:

kiL = liquid-phase mass transfer coefficient of i cm/s =9.87E-04R = ideal gas constant atm-m³/mole-°K =8.20E-05T = average system absolute temperature =298Hi = Henry's Law constant of TCE (atm-m³/mol) =9.85E-03KiG = gas-phase mass transfer coefficient of i cm/s4.28E-01

 $Ki = 1 / \{(1/9.87E-4) + [(298 \times 8.2E-5) / (9.85E-3 \times 0.428]\} =$ 

9.81E-04 cm/s

## 4. Calculation of VF (Volatilization Factor)

 $VF = (Ki \times A \times F \times 10^{-3} \times 10^{4} \times 3,600) / (ACH \times V)$ 

Where:

VF = volatilization factor (L/m<sup>3</sup>)

Ki = overall mass transfer coefficient of contaminant = 9.81E-04 cm/s

A = area of the trench = 8.18 m<sup>2</sup>

F = fraction of floor through which contaminant can enter (unitless) = 1

ACH = air changes per hour = 360 h<sup>-1</sup>

V = volume of trench = 24.92 m<sup>3</sup>

 $10^{-3}$  = conversion factor L/cm<sup>3</sup> 0.001  $10^4$  = conversion factor cm<sup>2</sup>/m<sup>2</sup> 10000 3,600 = conversion factor seconds/hr 3600

VF =  $(9.82E-4 \times 8.18 \times 1 \times 10^{-3} \times 10^{4} \times 3,600) / (360 \times 24.92) =$ 

3.22E-02 L/m<sup>3</sup>

## 5. Calculation of C<sub>trench</sub> (concentration of contaminant in the trench)

C<sub>trench</sub> = C<sub>GW</sub> x VF

Where:

C<sub>trench</sub> = concentration of contaminant in the trench (μg/m<sup>3</sup>)

C<sub>GW</sub> = concentration of TCE in groundwater =

3.9 μg/L

VF = volatilization factor =

3.22E-02 L/m<sup>3</sup>

 $C_{trench} = 3.9 \,\mu g/L \times 3.22 \text{E} - 02 \,L/\text{m}3 = 1.26 \text{E} - 01 \,\mu g/\text{m}^3$ 

CLIENT:		JOB NUMBER:			
NAVSTA NEWPORT, NEWPORT,	112G02747				
SUBJECT:					
CALCULATION OF INTAKE/RISK	CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES				
FROM GROUNDWATER - CONSTRUCTION WORKERS					
BASED ON:					
USEPA, DECEMBER 1989					
BY:	СНЕСКЕР ВҮ:	DATE:			
R. JUPIN	J. Eik	9/14/2012			

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of

volatiles from groundwater at fomer Building 234.

EC =  $\frac{\text{Ca x ET x EF x ED}}{\text{AT x 24 hours/day}}$ 

Where:

EC = exposure concentration (mg/m3)

Ca = exposure point concentration in air (mg/m3)

ET = exposure time (hrs/day)

EF = exposure frequency (days/year)

ED = exposure duration (years)
AT = averaging time (days)

IURi = inhalation unit risk ((ug/m3)<sup>-1</sup>)

RfCi = inhalation reference concentration (mg/m3)

# RISKS:

ILCR (Carcinogens) = Exposure Concentration (mg/m3) x IURi (ug/m3)-1 x 1000 ug/mg HQ (Noncarcinogens) = Exposure Concentration (mg/m3) / RFCi (mg/m3)

<u> </u>				
Ca	=	1.26E-04	mg/m3	Chemical: Trichloroethene
ET	=	8	hr/day	
EF	=	130	days/year	
ED	=	1	years	
ATc	=	25,550	days	
ATnc	=	365	days	
IURi	=	2.0E-06	(ug/m <sup>3</sup> ) <sup>-1</sup>	
RfCi	=	1.0E-02	mg/m³	

CLIENT:	JOB NUMBER:			
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND 112G02747				
SUBJECT:				
CALCULATION OF INTAKE/RISK F	FROM INHALATION O	F VOLATILES		
FROM GROUNDWATER - CONST	<b>RUCTION WORKERS</b>			
BASED ON:				
USEPA, DECEMBER 1989				
BY:	CHECKED BY:	DATE:		
R. JUPIN	I Cuta	- ` 9/14/2012		

## **EXAMPLE CARCINOGENIC CALCULATION**

IEXc = 1.26E-04 mg/m3 x 8 hr/day x 130 days/year x 1 years 25550 days x 24 hours/day

IEXc = 2.14E-07 mg/m3

ILCR = 2.14E-07 mg/m3 x 2.00E-06 (ug/m3)-1 x 1000 ug/mg = Incremental Lifetime Cancer Risk

ILCR = 4.3E-10

## **EXAMPLE NONCARCINOGENIC CALCULATION**

IEXnc = 1.26E-04 mg/m3 x 8 hr/day x 130 days/year x 1 years
365 days x 24 hours/day

IEXnc = 1.50E-05 mg/m3

HQ = 1.50E-05 mg/m3 / 1.00E-02 mg/m3 = Hazard Quotient

HQ **1.5E-03** 

CLIENT: JOB NUMBER:					
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND 112G02747					
SUBJECT:					
CALCULATION OF INTAKE/RISK	FROM INCIDENTAL IN	IGESTION OF SOIL FOR MUTAGENIC			
CHEMICALS - HYPOTHETICAL CI	HILD RESIDENTS				
BASED ON:	<del></del>				
USEPA, DECEMBER 1989, MARCH 2005					
BY: CHECKED BY: DATE:					
R. JUPIN	L. Cifa	<b>9/14/2012</b>			

**PURPOSE:** To estimate intake and cancer risks for mutagenic chemicals from incidental ingestion of surface soil at former Building 234.

EQUATION:  $IEX = \frac{CS \times IR \times EF \times ED \times FI \times CF}{BW \times AT} \times ADAF$ 

Where:

IEX = estimated exposure intake (mg/kg/day)
Cs = exposure point concentration in soil (mg/kg)

IR = incidental ingestion rate (mg/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)

FI = fraction ingested from contaminated source (unitless)

CF = conversion factor (1.0E-6 kg/mg)

BW = body weight (kg) AT = averaging time (days)

ADAF = age-dependent adjustment factor

CSFo = oral carcinogenic slope factor ((mg/kg/day)<sup>-1</sup>)

## **RISKS:**

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)-1

Cs	=	0.27	mg/kg	Chemical: Benzo(a)pyrene
IR	=	200	mg/day	
EF	=	350	days/year	
$ED_1$	=	2	years	
$ED_2$	=	4	years	
FI	=	1		
CF	=	1.0E-06	kg/mg	
BW	=	15	kg	
ΑT	=	25,550	days	
CSFo	=	7.3E+00	(mg/kg/da	y) <sup>-1</sup>
ADAF <sub>1</sub>	=	10		
ADAF <sub>2</sub>	=	3		

# Page 2 of 2

CLIENT: JOB NUMBER:					
NAVSTA NEWPORT, NEWPORT,	112G02747				
SUBJECT:	<del></del>				
CALCULATION OF INTAKE/RISK	FROM INCIDENTAL INGESTION	OF SOIL FOR MUTAGENIC			
CHEMICALS - HYPOTHETICAL C	HILD RESIDENTS				
BASED ON:					
USEPA, DECEMBER 1989, MARC	USEPA, DECEMBER 1989, MARCH 2005				
BY:	CHECKED BY:	DATE:			
R. JUPIN 9/14/2012					
	<del></del>				

## **EXAMPLE CARCINOGENIC CALCULATION**

$$IEX_1 = \frac{0.27 \text{ mg/kg x } 200 \text{ mg/day x } 350 \text{ days/year x 2 years x 1 x 1.0E-06 kg/mg}}{15 \text{ kg x } 25550 \text{ days}} \times 10$$

$$IEX_1 = 9.86E-07 \text{ mg/kg/day}$$

$$IEX_2 = \frac{0.27 \text{ mg/kg x } 200 \text{ mg/day x } 350 \text{ days/year x 4 years x 1 x 1.0E-06 kg/mg}}{15 \text{ kg x } 25550 \text{ days}} \times 3$$

$$IEX_2 = 5.92E-07 \text{ mg/kg/day}$$

$$ILCR = 9.86E-07 \text{ mg/kg/day} + 5.92E-07 \text{ mg/kg/day}) \times 7.30E+00 \text{ (mg/kg/day)-1}$$

$$ILCR = 1.2E-05$$

CLIENT:		JOB NUMBER:			
NAVSTA NEWPORT, NEWPORT, RH	112G02747				
SUBJECT:	-				
CALCULATION OF INTAKE/RISK FRO	CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL FOR MUTAGENIC CHEMICALS				
HYPOTHETICAL CHILD RESIDENTS					
BASED ON:	BASED ON:				
USEPA, JULY 2004, MARCH 2005					
BY:	CHECKED BY:	DATE:			
R. JUPIN	J. Cufan.	9/14/2012			

**PURPOSE:** To estimate intake and cancer risks for mutagenic chemicals from dermal contact with surface soil at former Building 234.

EQUATION: DEX = Cs x CF x SA x AF x ABS x EF x ED BW x AT x ADAF

Where:

DEX = estimated exposure intake (mg/kg/day)
Cs = exposure point concentration in soil (mg/kg)

CF = conversion factor (1.0E-6 kg/mg)

SA = skin surface available for contact (cm²/day)

ABS = absorption factor (unitless)

AF = adherence factor (mg/cm²)

EF = exposure frequency (days/year)

ED = exposure duration (years)

BW = body weight (kg) AT = averaging time (days)

ADAF = age-dependent adjustment factor

CSFd = dermal carcinogenic slope factor ((mg/kg/day)<sup>-1</sup>)

## **RISKS:**

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFd (mg/kg/day)-1

Cs	=	0.27	mg/kg	Chemical: Benzo(a)pyrene
CF	=	1.0E-06	kg/mg	
SA	=	2,800	cm²/day	
AF	=	0.2	mg/cm <sup>2</sup>	
ABS	=	0.13		
EF	=	350	days/year	
ED <sub>1</sub>	=	2	years	
$ED_2$	=	4	years	
BW	=	15	kg	
ΑT	=	25,550	days	
CSFd	=	7.3E+00	(mg/kg/day	y) <sup>-1</sup>
ADAF <sub>1</sub>	=	10		
ADAF <sub>2</sub>	=	3		

CLIENT:	IENT:		
NAVSTA NEWPORT, NEWPORT, RH	ODE ISLAND	112G02747	
SUBJECT:	· · · · ·		
CALCULATION OF INTAKE/RISK FRO	OM DERMAL CONTACT WITH SOIL	FOR MUTAGENIC CHEMICALS	
HYPOTHETICAL CHILD RESIDENTS			
BASED ON:			
USEPA, JULY 2004, MARCH 2005			
BY:	CHECKED BY:	DATE:	
R. JUPIN	9/14/2012		
	<del></del>		

## **EXAMPLE CARCINOGENIC CALCULATION**

DEXC = 0.27 mg/kg x 1.0E-06 kg/mg x 2800 cm2/day x 0.2 mg/cm2 x 0.13 x 350 days/year x 2 years x 10

DEXC = 3.59E-07 mg/kg/day

DEXC = 0.27 mg/kg x 1.0E-06 kg/mg x 2800 cm2/day x 0.2 mg/cm2 x 0.13 x 350 days/year x 4 years x 3 15 kg x 25550 days

DEXC = 2.15E-07 mg/kg/day

ILCR = 4.2E-06

CLIENT:		JOB NUMBER:	
NAVSTA NEWPORT, NEWPORT, F	RHODE ISLAND	112G02747	
SUBJECT:			
CALCULATION OF INTAKE/RISK F	ROM INHALATION OF FL	JGATIVE DUST EMISSIONS FOR	
MUTAGENIC CHEMICALS - HYPOTHETICAL CHILD RESIDENTS			
BASED ON:			
USEPA, DECEMBER 1989, MARCH	1 2005		
BY:	СНЕСКЕД ВУ:	DATE:	
R. JUPIN	L. Ciofa	9/14/2012	

**PURPOSE:** To estimate intake, carcinogenic risks for mutagenic chemicals from inhalation of surface soil at former Building 234.

EQUATION:  $EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}} \times ADAF$ 

Where:

EC = estimated exposure concentration (mg/m3)
Ca = exposure point concentration in air (mg/m3)

= Cs x 1/PEF

Cs = exposure point concentration in soil (mg/kg)

PEF = particulate emission factor (m3/kg)

ET = exposure time (hrs/day)

EF = exposure frequency (days/year) ED = exposure duration (years)

AT = averaging time (hours)

ADAF = age-dependent adjustment factor IUR = inhalation unit risk((ug/mg)<sup>-1</sup>)

## **RISKS:**

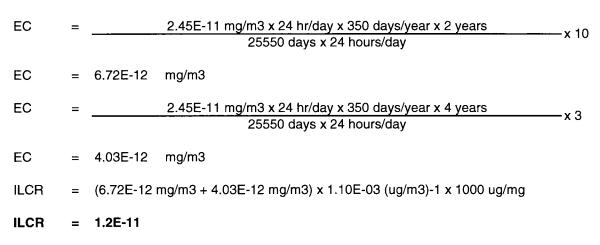
ILCR = Exposure concentration (mg/m3) x IURi (ug/m3)-1 x 1000 ug/mg

ASSUMI	<u> </u>	<u>N2:</u>		
Cs	=	0.27	mg/kg	Chemical: Benzo(a)pyrene
PEF	=	1.10E+10	m3/kg	
Ca	=	2.45E-11	mg/m3	
ET	=	24	hr/day	
EF	=	350	days/year	
$ED_1$	=	2	years	
$ED_2$	=	4	years	
ATc	=	25,550	days	
IUR	=	1.1E-03	(ug/m3) <sup>-1</sup>	
ADAF <sub>1</sub>	=	10		
$ADAF_2$	=	3		

# Page 2 of 2

CLIENT:		JOB NUMBER:
NAVSTA NEWPORT, NEWPORT, F	RHODE ISLAND	112G02747
SUBJECT:		
CALCULATION OF INTAKE/RISK F	ROM INHALATION OF F	FUGATIVE DUST EMISSIONS FOR
MUTAGENIC CHEMICALS - HYPOTHETICAL CHILD RESIDENTS		
BASED ON:		
USEPA, DECEMBER 1989, MARCH	1 2005	
BY:	CHECKED BY:	DATE:
R. JUPIN	1 L. Cufe	9/14/2012

## **EXAMPLE CARCINOGENIC CALCULATION**



CLIENT:	<del>-</del>	JOB NUMBER:		
NAVSTA NEWPORT, NEWPORT,	RHODE ISLAND	112G02747		
SUBJECT:				
CALCULATION OF INTAKE/RISK I	FROM INCIDENTAL INC	SESTION OF SOIL FOR MUTAGENIC		
CHEMICALS - HYPOTHETICAL AL	CHEMICALS - HYPOTHETICAL ADULT RESIDENTS			
BASED ON:	•			
USEPA, DECEMBER 1989, MARC	H 2005			
BY:	CHECKED BY:	DATE:		
R. JUPIN	L. Curken	9/14/2012		

**PURPOSE:** To estimate intake and cancer risks for mutagenic chemicals from incidental ingestion of surface soil at former Building 234.

EQUATION:  $IEX = \frac{CS \times IR \times EF \times ED \times FI \times CF}{BW \times AT} \times ADAF$ 

Where:

IEX = estimated exposure intake (mg/kg/day)
Cs = exposure point concentration in soil (mg/kg)

IR = incidental ingestion rate (mg/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)

FI = fraction ingested from contaminated source (unitless)

CF = conversion factor (1.0E-6 kg/mg)

BW = body weight (kg) AT = averaging time (days)

ADAF = age-dependent adjustment factor

CSFo = oral carcinogenic slope factor ((mg/kg/day)<sup>-1</sup>)

### RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)-1

ACCOM	<u> </u>	<u> 110.</u>		
Cs	=	0.27	mg/kg	Chemical: Benzo(a)pyrene
IR	=	100	mg/day	
EF	=	350	days/year	
$ED_1$	=	10	years	
$ED_2$	=	14	years	
FI	=	1		
CF	=	1.0E-06	kg/mg	
BW	=	70	kg	
AT	=	25,550	days	
CSFo	=	7.3E+00	(mg/kg/da	y) <sup>-1</sup>
ADAF <sub>1</sub>	=	3		
ADAF <sub>2</sub>	=	1		

# Page 2 of 2

CLIENT:		JOB NUMBER:	
NAVSTA NEWPORT, NEWPORT,	RHODE ISLAND	112G02747	
SUBJECT:	•		
CALCULATION OF INTAKE/RISK I	FROM INCIDENTAL INGESTION	N OF SOIL FOR MUTAGENIC	
CHEMICALS - HYPOTHETICAL ADULT RESIDENTS			
BASED ON:			
USEPA, DECEMBER 1989, MARC	H 2005		
BY:	CHECKED BY:	DATE:	
R. JUPIN	L. Cufa	9/14/2012	

# **EXAMPLE CARCINOGENIC CALCULATION**

$$| EX_1 | = \frac{0.27 \text{ mg/kg x } 100 \text{ mg/day x } 350 \text{ days/year x } 10 \text{ years x } 1 \text{ x } 1.0\text{E-}06 \text{ kg/mg}}{70 \text{ kg x } 25550 \text{ days}} \times 3$$

$$| EX_1 | = 1.59\text{E-}07 \text{ mg/kg/day}$$

$$| EX_2 | = \frac{0.27 \text{ mg/kg x } 100 \text{ mg/day x } 350 \text{ days/year x } 14 \text{ years x } 1 \text{ x } 1.0\text{E-}06 \text{ kg/mg}}{70 \text{ kg x } 25550 \text{ days}} \times 1$$

$$| EX_2 | = 7.40\text{E-}08 \text{ mg/kg/day}$$

$$| EX_2 | = 7.40\text{E-}08 \text{ mg/kg/day}$$

$$| EX_2 | = 1.59\text{E-}07 \text{ mg/kg/day} + 7.40\text{E-}08 \text{ mg/kg/day}) \times 7.30\text{E+}00 \text{ (mg/kg/day)-}1$$

$$| EX_2 | = 1.7\text{E-}06$$

LIENT:		JOB NUMBER:	
NAVSTA NEWPORT, NEWPORT, RH	NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		
SUBJECT:			
CALCULATION OF INTAKE/RISK FRO	OM DERMAL CONTACT WITH SOIL	FOR MUTAGENIC CHEMICALS	
HYPOTHETICAL ADULT RESIDENTS	HYPOTHETICAL ADULT RESIDENTS		
BASED ON:			
USEPA, JULY 2004, MARCH 2005			
BY:	CHECKED BY:	DATE:	
R. JUPIN	L. Cufer	9/14/2012	

**PURPOSE:** To estimate intake and cancer risks for mutagenic chemicals from dermal contact with surface soil at former Building 234.

EQUATION: DEX = Cs x CF x SA x AF x ABS x EF x ED x ADAF

Where:

DEX = estimated exposure intake (mg/kg/day)
Cs = exposure point concentration in soil (mg/kg)

CF = conversion factor (1.0E-6 kg/mg)

SA = skin surface available for contact (cm²/day)

ABS = absorption factor (unitless)

AF = adherence factor (mg/cm²)

EF = exposure frequency (days/year)

ED = exposure duration (years)

BW = body weight (kg)
AT = averaging time (days)

ADAF = age-dependent adjustment factor

CSFd = dermal carcinogenic slope factor ((mg/kg/day)<sup>-1</sup>)

## RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFd (mg/kg/day)-1

7.1000.		-		
Cs	=	0.27	mg/kg	Chemical: Benzo(a)pyrene
CF	=	1.0E-06	kg/mg	
SA	=	5,700	cm <sup>2</sup> /day	
AF	=	0.07	mg/cm <sup>2</sup>	
ABS	=	0.13		
EF	=	350	days/year	
ED <sub>1</sub>	=	10	years	
$ED_2$	=	14	years	
BW	=	70	kg	
AT	=	25,550	days	
CSFd	=	7.3E+00	(mg/kg/day	y) <sup>-1</sup>
ADAF <sub>1</sub>	=	3		
ADAF <sub>2</sub>	=	1		
	Cs CF SA AF ABS EF ED <sub>1</sub> ED <sub>2</sub> BW AT CSFd ADAF <sub>1</sub>	Cs = CF = SA = AF = ABS = EF = ED <sub>1</sub> = ED <sub>2</sub> = BW = AT = CSFd = ADAF <sub>1</sub> =	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cs = 0.27 mg/kg CF = 1.0E-06 kg/mg SA = 5,700 cm²/day AF = 0.07 mg/cm² ABS = 0.13 EF = 350 days/year ED <sub>1</sub> = 10 years ED <sub>2</sub> = 14 years BW = 70 kg AT = 25,550 days CSFd = 7.3E+00 (mg/kg/day ADAF <sub>1</sub> = 3

CLIENT:	JENT:		
NAVSTA NEWPORT, NEWPORT, RE	NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		
SUBJECT:		-	
CALCULATION OF INTAKE/RISK FR	OM DERMAL CONTACT WITH SOIL	. FOR MUTAGENIC CHEMICALS	
HYPOTHETICAL ADULT RESIDENTS	S		
BASED ON:			
USEPA, JULY 2004, MARCH 2005			
BY:	CHECKED BY:	DATE:	
R. JUPIN J. Cufer 9/14/2012			

## **EXAMPLE CARCINOGENIC CALCULATION**

ILCR

= 8.8E-07

DEXc = 0.27 mg/kg x 1.0E-06 kg/mg x 5700 cm2/day x 0.07 mg/cm2 x 0.13 x 350 days/year x 10 years 70 kg x 25550 days

DEXc = 8.22E-08 mg/kg/day

DEXc = 0.27 mg/kg x 1.0E-06 kg/mg x 5700 cm2/day x 0.07 mg/cm2 x 0.13 x 350 days/year x 14 years 70 kg x 25550 days

DEXc = 3.84E-08 mg/kg/day

ILCR = (8.22E-08 mg/kg/day + 3.84E-08 mg/kg/day) x 7.30E+00 (mg/kg/day)-1

CLIENT:		JOB NUMBER:	
NAVSTA NEWPORT, NEWPORT, F	RHODE ISLAND	112G02747	
SUBJECT:			
CALCULATION OF INTAKE/RISK F	ROM INHALATION OF F	JGATIVE DUST EMISSIONS FOR	
MUTAGENIC CHEMICALS - HYPO	MUTAGENIC CHEMICALS - HYPOTHETICAL ADULT RESIDENTS		
BASED ON:	-		
USEPA, DECEMBER 1989, MARCH	l 2005		
BY:	CHECKED BY:	DATE:	
R. JUPIN	L'Cufer	9/14/2012	

**PURPOSE:** To estimate intake, carcinogenic risks for mutagenic chemicals from inhalation of surface soil at former Building 234.

EQUATION:  $EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}} \times ADAF$ 

Where:

EC = estimated exposure intake (mg/kg/day)
Ca = exposure point concentration in air (mg/m3)

= Cs x 1/PEF

Cs = exposure point concentration in soil (mg/kg)

PEF = particulate emission factor (m3/kg)

IR = inhlation rate (m3/hr) ET = exposure time (hrs/day)

EF = exposure frequency (days/year)

ED = exposure duration (years)

BW = body weight (kg) AT = averaging time (hours)

ADAF = age-dependent adjustment factor IURi = inhalation unit risk((ug/mg)<sup>-1</sup>)

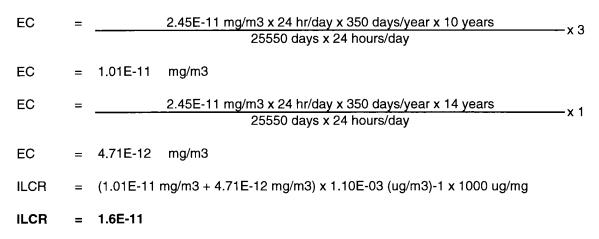
# **RISKS:**

ILCR = Exposure concentration (mg/m3) x IUR (ug/m3)-1 x 1000 ug/mg

ACCOM	· · · · <u> </u>	110.		
Cs	=	0.27	mg/kg	Chemical: Benzo(a)pyrene
PEF	=	1.10E+10	m3/kg	
Ca	=	2.45E-11	mg/m3	
ET	=	24	hr/day	
EF	=	350	days/year	
ED <sub>1</sub>	=	10	years	
$ED_2$	=	14	years	
ATc	=	25,550	days	
IUR	=	1.1E-03	(ug/m3) <sup>-1</sup>	
ADAF <sub>1</sub>	=	3		
ADAF <sub>2</sub>	=	1		

CLIENT:		JOB NUMBER:							
NAVSTA NEWPORT, NEWPORT, R	RHODE ISLAND 112G02747								
SUBJECT:	SUBJECT:								
CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS FOR									
MUTAGENIC CHEMICALS - HYPOT	HETICAL ADULT RESIDENTS								
BASED ON:									
USEPA, DECEMBER 1989, MARCH	2005								
BY:	CHECKED BY: DATE:								
R. JUPIN	L. Cirfar 9/14/2012								

## **EXAMPLE CARCINOGENIC CALCULATION**



# **APPENDIX F.5**

**SCREENING RISK EVALUATION FOR VAPOR INTRUSION** 

SCREENING RISK EVALUATION FOR VAPOR INTRUSION

VISL CALCULATIONS – NORTH WATERFRONT GROUNDWATER

### OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

		Site Groundwater Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Cgw	Cia	0.0	
CAS Chemical Name	(ug/L)	(ug/m³)	CR	но	
156-59-2	Dichloroethylene, 1,2-cis-	4.3E+00	5.71E-01	No IUR	No RfC
156-60-5	Dichloroethylene, 1,2-trans-	4.8E+00	6.53E-01	No IUR	1.0E-02
127-18-4	Tetrachloroethylene	7.0E-01	3.83E-01	4.1E-08	9.2E-03
79-01-6	Trichloroethylene	3.3E+01	1.04E+01	2.4E-05	5.0E+00
75-01-4	Vinyl Chloride	1.5E+00	1.45E+00	9.0E-06	1.4E-02
	Trichloroethylene		_		Symbol

Inhalation Unit Risk	IUR Source*	Reference Concentration RfC	RFC Source*	Mutagenic Indicator		
(ug/m³)-1	rija - <u>mälikka nagasa</u>	(mg/m³)	ri Listi	N. 1.		
		6.00E-02	P			
2.60E-07		4.00E-02	1			
see note	1	2.00E-03		TCE		
4.40E-06	_	1.00E-01	_	VC		
Symbol	Value			Symbol		

Value

Value

Vinyl Chloride

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	[instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

		ls Chemical Sufficiently Votatile and Toxic to Pose Inhelation Risk Via Vapor intrusion from Soll Source?	ls Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vepor Intrusion from Groundwater Source?		Toxicity	Gas Conc. @		ls Target	Temperature for Groundwater Vapor Conc.	Lower Explosive Source	inhalation Unit		Reference Concentration	RFC Source*	Mutagenic Indicator	Target Indoor Air Cone, for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non- Carolnogens @ THQ = 1
		Cvp > Cia,target/AFss?	Cvp > Cia,target/AFgw?	MIN(Cla,c;Cla,nc)		Csg	Cgw	Cgw <mcl7< th=""><th>Tgw or 25</th><th>LEL</th><th>IUA</th><th></th><th>RfC</th><th>Sec. 25.</th><th></th><th>Cla<sub>s</sub>c</th><th>Cla,nc</th></mcl7<>	Tgw or 25	LEL	IUA		RfC	Sec. 25.		Cla <sub>s</sub> c	Cla,nc
CAS	Chemical Name	Yes/No	Yes/No	(ug/m³)	G/NC	(ug/m³)	(ug/L)	Yes/No (MCL ug/L)	c	(% by vol)	(ug/m³)-1		(mg/m³)			(ug/m³)	(ug/m³)
x 540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	No Inhai. Tox. Info	No Inhal. Tox. Info						20								
156-59-2	Dichloroethylene, 1,2-cis-	No Inhal. Tox. Info	No Inhal. Tox. Info	-	-			No (70)	20	9.7 M							
156-60-5	Dichloroethylene, 1,2-trans-	Yes	Yes	6.3E+01	NC	6.3E+02	4.6E+02	No (100)	20	9.7 M		I	6.00E-02	Ρ			6.3E+01
x 127-18-4	Tetrachloroethylene	Yes	Yes	9.4E+00	Č	9.4E+01	1.7E+01	No (5)	20		2.60E-07		4.00E-02			9.4E+00	4.2E+01
x 79-01-6	Trichloroethylene	Yes	Yes	4.3E-01	С	4.3E+00	1.4E+00	Yes (5)	20	8 N	see note	l i	2.00E-03	1	TCE	4.3E-01	2.1E+00
x 75-01-4	Vinyl Chloride	Yes	Yes	1.6E-01	C	1.6E+00	1.6E-01	Yes (2)	20	3.6 N	4.40E-06		1.00E-01		VC	1.6È-01	1.0E+02
×	Trichloroethylene Vinyl Chloride	See the Navigation Guid	de equation for Cia,c for vi	nyl chloride.	Symbol	Value	Symbol	Value	Symbol	Value							

### OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions (Instructions)
Exposure Scenario	Scenario		Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR		Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (°C)	Taw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

		Site Groundwater Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
1		Cgw	Cia	CR	
CAS	Chemical Name	(ug/L)	(ug/m³)	CH	HQ
156-59-2	Dichloroethylene, 1,2-cis-	4.3E+00	5.71E-01	No IUR	No RfC
156-60-5	Dichloroethylene, 1,2-trans-	4.8E+00	6.53E-01	No IUR	2.5E-03
127-18-4	Tetrachloroethylene	7.0E-01	3.83E-01	8.1E-09	2.2E-03
79-01-6	Trichloroethylene	3.3E+01	1.04E+01	3.5E-06	1.2E+00
75-01-4	Vinyl Chloride	1.5E+00	1.45E+00	5.2E-07	3.3E-03
	Trichloroethylene				Symbol

		6.00E-02	Р	
2.60E-07		4.00E-02	_	
see note	1	2.00E-03	-	TCE
4.40E-06	1	1.00E-01		VC

IUR

Source\*

Value

Reference

Concentration

RfC

(mg/m<sup>3</sup>)

Value

Inhalation Unit

Risk

IUR (ug/m³)

Symbol

Trichloroethylene Vinyl Chloride

See the Navigation Guide equation for Cia,c for vinyl chloride.

Value

Mutagenic

Indicator

Symbol

RFC

Source

OSWER VAPOR INTRUSION ASSESSMENT Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	[instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

				1E-06 or THQ = 1		Gas Conc. @	Target Ground Water Conc. @ TCR = 1E-08 or THQ = 1 Cgw	is Target	Temperature for Groundwater Vapor Conc, Tgw or 25	Lower So Explosive	Inhalation Unit		Reference Concentration RIC	RFC Source*	Mutagenic indicator	Target Indoor Air Conc. for Carcinogens © TCR = 1E-06 Cla.c	Terget indoor Air Conc. for Non- Carolnogens & THQ = 1 Cla,nc
CAS	Chemical Name	Yes/No	Yes/No	(ug/m³)	C/NC	(ug/m³)	(ug/L)	(MCL ug/L)	С	(% by vol)	(ug/m <sup>3</sup> ) 1		(mg/m³)			(ug/m³)	(ug/m³)
x 540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	No Inhal. Tox. Info	No Inhal. Tox. Info				_	~	20								
156-59-2	Dichloroethylene, 1,2-cis-	No Inhal. Tox. Into	No Inhal. Tox. Info	**			-	No (70)	20	9.7 M							
156-60-5	Dichloroethylene, 1,2-trans-	Yes	Yes	2.6E+02	NC	2.6E+03	1.9E+03	No (100)	20	9.7 M			6.00E-02	P			2.6E+02
x 127-18-4	Tetrachloroethylene	Yes	Yes	4.7E+01	С	4.7E+02	8.6E+01	No (5)	20		2.60E-07	_	4.00E-02			4.7E+01	1.8E+02
x 79-01-6	Trichloroethylene	Yes	Yes	3.0E+00	С	3.0E+01	9.5E+00	No (5)	20	8 N	see note		2.00E-03		TCE	3.0E+00	8.8E+00
x 75-01-4	Vinyl Chloride	Yes	Yes	2.8E+00	С	2.8E+01	2.8E+00	No (2)	20	3.6 N	4.40E-06	L	1.00E-01		VC	2.8E+00	4.4E+02
x	Trichloroethylene Vinyl Chloride		de equation for Cla.c for vi		Symbol	Value	Symbol	Value	Symbol	Value							

SCREENING RISK EVALUATION FOR VAPOR INTRUSION
VISL CALCULATIONS – NORTH WATERFRONT SOIL GAS

## OSWER V. POR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter Helius	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	. 1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

			Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
			Csg	Cia		
	CAS	Chemical Name	(ug/m³)	(ug/m³)	CR	HQ
	107-13-1	Acrylonitrile	2.8E+00	2.80E-01	7.8E-06	1.3E-01
X	71-43-2	Benzene	6.7E-01	6.70E-02	2.1E-07	2.1E-03
	106-99-0	Butadiene, 1,3-	1.3E+01	1.30E+00	1.6E-05	6.2E-01
х	75-34-3	Dichloroethane, 1,1-	2.5E-01	2.50E-02	1.6E-08	No RfC
х	540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	3.1E+01	3.11E+00	No IUR	No RfC
	156-59-2	Dichloroethylene, 1,2-cis-	2.7E+01	2.70E+00	No IUR	No RfC
	156-60-5	Dichloroethylene, 1,2-trans-	4.1E+00	4.10E-01	No IUR	6.6E-03
X	127-18-4	Tetrachloroethylene	1.2E+01	1.20E+00	1.3E-07	2.9E-02
х	71-55-6	Trichloroethane, 1,1,1-	2.6E-01	2.60E-02	No IUR	5.0E-06
х	79-01-6	Trichloroethylene	1.2E+02	1.20E+01	2.8E-05	5.8E+00
X	75-01-4	Vinyl Chloride	7.6E-01	7.60E-02	4.7E-07	7.3E-04
x		Trichloroethylene				Symbol
x		Vinyl Chloride	See the Navigation 0	Guide equation for (	Cia,c for vinyl chlo	ride.

Inhalation Unit Risk	IUR	Reference Concentration RFC Source		IUR Concentration		Mutagenic Indicator
IUR	Source*	RfC	Source	1.00		
(ug/m³) <sup>-1</sup>		(mg/m³)				
6.80E-05	ı	2.00E-03	1			
7.80E-06	- 1	3.00E-02	1			
3.00E-05	I	2.00E-03	1			
1.60E-06	CA					
		6.00E-02	P			
2.60E-07	1	4.00E-02	l I			
		5.00E+00	l I			
see note		2.00E-03	Ī	TCE		
4.40E-06	1	1.00E-01	1	VC		
Symbol	Value	-		Symbol		

Value

Value

OSWER VAPOR INTRUSION ASSESSMENT Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	l Taw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

			la Chemical Sufficiently Volatile and Toxic to Pose Inhalation Riek Via Vapor Intrusion from Soil Source?	Is Chemical Sufficiently Voletile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source?	1E-06 or THQ = 1	Toxicity Basis	THQ = 1	Target Ground Water Conc. & TCR = 1E-06 or THQ = 1	is Target Ground Water Conc. < MCL?	Temperature for Groundwater Vapor Conc.	Lower Explosive Limit**	LEL Source
			Cvp > Cia,target/AFss?	Cvp > Cla,target/AFgw?	MIN(Cla,c;Cla,nc)		Csg	Cgw	Cgw <mcl?< th=""><th>Tow or 25</th><th>LEL</th><th>1</th></mcl?<>	Tow or 25	LEL	1
	CAS	Chemical Name	Yes/No	Yes/No	(ug/m³)	C/NC	(ug/m³)	(ug/L)	Yes/No (MCL ug/L)	С	(% by vol)	
	107-13-1	Acrylonitrile	Yes	Yes	3.6E-02	C	3.6E-01	8.2E+00		20	3	N
x	71-43-2	Benzene	Yes	Yes	3.1E-01	С	3.1E+00	1.7E+00	Yes (5)	20	1.2	N
	106-99-0	Butadiene, 1,3-	Yes	Yes	8.1E-02	С	8.1E-01	3.1E-02		20	2	N
х	75-34-3	Dichloroethane, 1,1-	Yes	Yes	1.5E+00	С	1.5E+01	8.2E+00		20	5.4	N
×	75-35-4	Dichloroethylene, 1,1-	Yes	Yes	2.1E+02	NC	2.1E+03	2.3E+02	No (7)	20	6.5	N
x	540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	No Inhal. Tox. Info	No Inhal, Tox, Info	-					20		
	156-59-2	Dichloroethylene, 1,2-cls-	No Inhal. Tox. Info	No Inhal. Tox. Info				-	No (70)	20	9.7	М
	156-60-5	Dichloroethylene, 1,2-trans-	Yes	Yes	6.3E+01	NC	6.3E+02	4.6E+02	No (100)	20	9.7	М
×	127-18-4	Tetrachioroethylene	Yes	Yes	9.4E+00	C	9.4E+01	1.7E+01	No (5)	20	ļ	_
x	71-55-6	Trichloroethane, 1,1,1-	Yes	Yes	5.2E+03	NC	5.2E+04	9.3E+03	No (200)	20	7.5	N
x	79-01-6	Trichloroethylene	Yes	Yes	4.3E-01	С	4.3E+00	1.4E+00	Yes (5)	20	8	N
x	75-01-4	Vinyl Chloride	Yes	Yes	1.6E-01	Ç	1.6E+00	1.6E-01	Yes (2)	20	3.6	N
x		Trichloroethylene				Symbol	Value	Symbol	Value	Symbol	Value	
				1 1 1 Cla a 1 a	and ablantals							

inhaletion Unit Risk	IUR Source	Reference Concentration	RFC Source	Mutagenic indicator	Target Indoor Air Cone, for Carcinogens @ TCR = 1E-06	Terget Indoor Air Cone, for Non- Carcinogena @ THQ = 1
IUR	ntibeliti	RIÇ			Cia,c	Clarac
(ug/m³) ¹		(mg/m³)			(ug/m³)	(ug/m³)
6.80E-05	1	2.00E-03	1		3.6É-02	2.1E+00
7.80E-06	_	3.00E-02			3.1E-01	3.1E+01
3.00E-05	1	2.00E-03			8,1E-02	2.1E+00
1.60E-06	CA				1.5E+00	
		2.00E-01				2.1E+02
		6.00E-02	P			6.3E+01
2.60E-07		4.00E-02	<u> </u>		9.4E+00	4.2E+01
		5.00E+00	i	T		5.2E+03
see note	i i	2.00E-03		TCE	4.3E-01	2.1E+00
4.40E-06	_	1.00E-01		VC	1.6E-01	1.0E+02

### OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions The Advanced Control of the Control of
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

			Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
			Csg	Cia	CR	HQ
	CAS	Chemical Name	(ug/m³)	(ug/m³)	L Cn	по
	107-13-1	Acrylonitrile	2.8E+00	2.80E-01	1.6E-06	3.2E-02
X	71-43-2	Benzene	6.7E-01	6.70E-02	4.3E-08	5.1E-04
	106-99-0	Butadiene, 1,3-	1.3E+01	1.30E+00	3.2E-06	1.5E-01
X	75-34-3	Dichloroethane, 1,1-	2.5E-01	2.50E-02	3.3E-09	No RfC
X	540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	3.1E+01	3.11E+00	No IUR	No RfC
	156-59-2	Dichloroethylene, 1,2-cis-	2.7E+01	2.70E+00	No IUR	No RfC
	156-60-5	Dichloroethylene, 1,2-trans-	4.1E+00	4.10E-01	No IUR	1.6E-03
х	127-18-4	Tetrachloroethylene	1.2E+01	1.20E+00	2.5E-08	6.8E-03
X	71-55-6	Trichloroethane, 1,1,1-	2.6E-01	2.60E-02	No IUR	1.2E-06
X	79-01-6	Trichloroethylene	1.2E+02	1.20E+01	4.0E-06	1.4E+00
х	75-01-4	Vinyl Chloride	7.6E-01	7.60E-02	2.7E-08	1.7E-04
x		Trichloroethylene				Symbol

Inhalation Unit Risk	IUR	Reference Concentration	RFC	Mutagenic Indicator		
IUR	Source*	RfC	Source*			
(ug/m <sup>3</sup> )-1		(mg/m³)	]	and a land		
6.80E-05	i	2.00E-03				
7.80E-06		3.00E-02	1			
3.00E-05	ı	2.00E-03				
1.60E-06	CA					
		6.00E-02	P			
2.60E-07	1	4.00E-02	1			
		5.00E+00		-		
see note	1	2.00E-03	ı	TCE		
4.40E-06	- 1	1.00E-01	-	VC		
Symbol	Value			Symbol		

Value

Value

Trichloroethylene Vinyl Chloride

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

			is Chemical Sufficiently Volatile and Toxic to Pose Inhelation Riek Via Vapor intrusion from Soil Source?	Is Chemical Sufficiently Volatile and Toxic to Pose Inhelation Risk Via Vapor Intrusion from Groundwater Source?			THQ = 1	Water Conc. @ TCR = 1E-06 or THQ = 1	is Target Ground Water Conc. < MCL?		Lower Explosive Limit**	LEL Source	Inhelation Unit
	l	300	Cvp > Cla,target/AFss?	Cvp > Cla,target/AFgw?	MIN(Cla,c;Cla,nc)		Csg	Cgw	Cgw <mcl7< th=""><th>Tgw or 25</th><th>LEL</th><th>ы</th><th>IUA</th></mcl7<>	Tgw or 25	LEL	ы	IUA
	CAS	Chemical Name	Yes/No	Yes/No	(ug/m³)	G/NC	(ug/m³)	(ug/L)	Yes/No (MCL ug/L)	С	(% by vol)		(ug/m <sup>3</sup> )-1
	107-13-1	Acrylonitrile	Yes	Yes	1.8E-01	С	1.8E+00	4.1E+01		20	3	N	6.80E-05
x	71-43-2	Benzene	Yes	Yes	1.6E+00	С	1.6E+01	8.7E+00	No (5)	20	1.2	N	7.80E-06
	106-99-0	Butadiene, 1,3-	Yes	Yes	4.1E-01	Ç.	4.1E+00	1.6E-01	h-r	20	2	N	3.00E-05
x	75-34-3	Dichloroethane, 1,1-	Yes	Yes	7.7E+00	C	7.7E+01	4.1E+01		20	5.4	N	1.60E-06
x	75-35-4	Dichloroethylene, 1,1-	Yes	Yes	8.8E+02	NC	8.6E+03	9.9€+02	No (7)	20_	6.5	N	
×	540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	No Inhal. Tox. Info	No Inhal. Tox. Info				-		20	_		
	156-59-2	Dichloroethylene, 1,2-cis-	No Inhal. Tox. Info	No Inhal, Tox, Info	-				No (70)	20	9.7	M	
	156-60-5	Dichloroethylene, 1,2-trans-	Yes	Yes	2.6E+02	NC	2.6E+03	1.9E+03	No (100)	20	9.7	М	
×	127-18-4	Tetrachloroethylene	Yes	Yes	4.7E+01	C	4.7E+02	8.6E+01	No (5)	20		Ш	2.60E-07
×	71-55-6	Trichloroethane, 1,1,1-	Yes	Yes	2.2E+04	NC	2.2E+05	3.9E+04	No (200)	20	7.5	N	
x	79-01-6	Trichloroethylene	Yes	Yes	3.0E+00	Ċ	3.0E+01	9.5E+00	No (5)	20	8	N	see note
×	75-01-4	Vinyl Chloride	Yes	Yes	2.8E+00	Ç	2.8E+01	2.8E+00	No (2)	20	3,6	N	4.40E-06
×		Trichtoroethylene				Symbol	Value	Symbol	Value	Symbol	Value		

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non- Carcinogens @ THQ = 1
IUA		RIC			Cla,c	Cia,nc
(ug/m³)-1	98.9 Page	(mg/m³)			(ug/m³)	(ug/m³)
6.80E-05		2.00E-03			1.8E-01	8.8E+00
7.80E-06		3.00E-02	1		1.6E+00	1.3E+02
3.00E-05		2.00E-03	_		4.1E-01	8.8E+00
1.60E-06	CA				7.7E+00	
		2.00E-01	J			8.8E+02
		6.00E-02	P		-	2.6E+02
2.60E-07	i -	4.00E-02	<u> </u>	1	4.7E+01	1.8E+02
		5.00E+00	1			2.2E+04
see note		2.00E-03	-	TCE	3.0E+00	8.8E+00
4.40F-06	· - · · ·	1.00F-01	1	VC	2.8F±00	4 4F+02

SCREENING RISK EVALUATION FOR VAPOR INTRUSION

VISL CALCULATIONS – FORMER BUILDING 234 GROUNDWATER

### DEWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions				
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list				
Target Risk for Carcinogens	TCR	1.00E-06	E-06 Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)				
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (tor comparison to the calculated VI hazard in column G)				
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations				

			Site Groundwater Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
	-		Cgw	Cia	25	
	CAS	Chemical Name	(ug/L)	(ug/m³)	CR	HQ
X	75-35-4	Dichloroethylene, 1,1-	2.5E-01	2.22E-01	No IUR	1.1E-03
	156-59-2	Dichloroethylene, 1,2-cis-	1.3E+01	1.70E+00	No IUR	No RfC
X	79-01-6	Trichloroethylene	4.0E+00	1.26E+00	2.9E-06	6.1E-01
X	75-01-4	Vinyl Chloride	1.0E+02	9.87E+01	6.1E-04	9.5E-01
X		Trichloroethylene	-			Symbol
X		Vinyl Chloride	See the Navigation	Guide equation for	r Cia,c for vinyl ch	loride.

Inhalation Unit Risk IUR	IUR Source*	Reference Concentration RfC	RFC Source*	Mutagenic Indicator
(ug/m³)-1		(mg/m³)		i i
		2.00E-01		
see note	1	2.00E-03		TCE
4.40E-06		1.00E-01		VC
Symbol	Value			Symbol

Value

Value

OSWER VAPOR INTRUSION ASSESSMENT Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	1 1 4	A M. Otto A B. Color A B. Color B. Colo	Is Chemical Sufficiently Votatile and Toxic to Pose Inhelation Risk Via Vapor Intrusion from Soil Source?	is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source?		Toxicity Basis		Target Ground Water Conc. @ TCR = 1E-06 or THO = 1	ls Target	Temperature for Groundwater Vapor Conc.	Lower Explosive Limit*	LEI Source	inheletion Plak
		<ul> <li>at the set of the Art A Contampolity of</li> </ul>	Cvp > Cia targeVAFss?	Cvp > Cla,target/AFgw?	MIN(Cla,c;Cla,nc)	1100000	Csg	Cgw	Cgw <mcl?< th=""><th>Tow or 25</th><th>LEL</th><th></th><th>IUR</th></mcl?<>	Tow or 25	LEL		IUR
	CAS	Chemical Name	Yes/No	Yes/No	(ug/m³)	C/NC	(ug/m³)	(ug/L)	Yes/No (MCL ug/L)	Ċ	(% by vol)		(ug/m³
×	75-35-4	Dichloroethylene, 1,1-	Yes	Yes	2.1E+02	NC	2.1E+03	2.3E+02	No (7)	20	6.5	N	
	156-59-2	Dichloroethylene, 1,2-cis-	No Inhal. Tox. Info	No Inhal. Tox. Info	-			-	No (70)	20	9.7	М	
×	79-01-6	Trichloroethylene	Yes	Yes	4.3E-01	С	4.3E+00	1.4E+00	Yes (5)	20	8	N	see no
×	75-01-4	Vinyl Chloride	Yes	Yes	1.6E-01	С	1.6E+00	1.6E-01	Yes (2)	20	3.6	N	4.40E-
×		Trichloroethylene		<u> </u>		Symbol	Value	Symbol	Value	Symbol	Value		

inheletion Unit	IUR Source*	Reference Concentration			Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non- Carcinogens @ THQ = 1
IUR		RIC			Cla,c	Cia,nc
(ug/m³) 1		(mg/m³)			(ug/m³)	(ug/m³)
		2.00E-01	1			2.1E+02
see note	1	2.00E-03	_	TÇE	4.3E-01	2.1E+00
4.40E-08	1 1	1 00E 01		VC	1.6E-01	1.0F±02

### OSWEF VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions Applications								
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list								
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)								
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)								
Average Groundwater Temperature (°C)	Taw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations								

		Site Groundwater Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	
		Cgw	Cia			
CAS	Chemical Name	(ug/L)	(ug/m³)	CR	HQ	
75-35-4	Dichloroethylene, 1,1-	2.5E-01	2.22E-01	No IUR	2.5E-04	
156-59-2	Dichloroethylene, 1,2-cis-	1.3E+01	1.70E+00	No IUR	No RfC	
79-01-6	Trichloroethylene	4.0E+00	1.26E+00	4.2E-07	1.4E-01	
75-01-4	Vinyl Chloride	1.0E+02	9.87E+01	3.5E-05	2.3E-01	
	Trichloroethylene				Symbol	
	Vinyl Chloride	See the Navigation	Guide equation for	Cia,c for vinyl ch	nloride.	

Symbol	Value			Symbol
4.40E-06		1.00E-01	1	VC
see note		2.00E-03	l i	TCE
		2.00E-01	1	
(ug/m³) <sup>-1</sup>		(mg/m³)		919 Jan   1100 Jan   1100 Jan   1100 Jan   1100 Jan   1100 Jan   1100 Jan   1100 Jan   1100 Jan   1100 Jan   1
IUR		RIC		

IUR

Reference

Concentration

Value

Inhalation Unit

Risk

Mutagenic

Indicator

RFC

OSWER VAPOR INTRUSION ASSESSMENT Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

14 1			Vapor Intrusion from Groundwater Source?		Toxicity Basis	Gas Conc. @ TCR = 1E-06 or THQ = 1	THQ = 1	Is Target Ground Water Conc. < MCL?	Temperature for Groundwater Vepor Conc.	Lower Explosive	Inhalation Unit	IUR Source*			Mutagenic Indicator	TCR = 1E-06	THQ = 1
1		Cvp > Cia,tergel/AFss?	Cvp > Cia,target/AFgw?	MIN(Cla,c,Cia,nc)	L	Csg	Cgw	Cgw <mcl7< td=""><td>Tgw or 25</td><td>LEL</td><td>IUR</td><td></td><td>RfC</td><td></td><td></td><td>Cla,c</td><td>Cia,nc</td></mcl7<>	Tgw or 25	LEL	IUR		RfC			Cla,c	Cia,nc
CAS	Chemical Name	Yes/No	Yes/No	(ug/m³)	_ C/NC	(ug/m³)	(ug/L)	Yes/No (MCL ug/L)	c	(% by vol)	(ug/m³) 1		(mg/m³)			(ug/m³)	(ug/m³)
x 75-35-4	Dichloroethylene, 1,1-	Yes	Yes	8.8E+02	NC	8.8E+03	9.9E+02	No (7)	20	6.5 N			2.00E-01				8.8E+02
156-59-2	Dichloroethylene, 1,2-cis-	No Inhal, Tox. Info	No Inhal. Tox. Into	-				No (70)	20	9.7 M		L					
x 79-01-6	Trichloroethylene	Yes	Yes	3.0E+00	С	3.0E+01	9.5E+00	No (5)	20	8 N	see note		2.00E-03		TCE	3.0E+00	8.8E+00
x 75-01-4	Vinyl Chloride	Yes	Yes	2.8E+00	С	2.8E+01	2.8E+00	No (2)	20	3.6 N	4.40E-06		1.00E-01		VC	2.8E+00	4.4E+02
x	Trichloroethylene Vinyl Chloride	See the Navigation Guid	te equation for Cia,c for vi	nyl chloride.	Symbol	Value	Symbol	Value	Symbol	Value							

# **APPENDIX F.6**

RAGS PART D TABLES FOR CHEMICALS
PRESENT AT NATURALLY OCCURRING LEVELS

### RAGS Part D Table 3

**Medium-Specific Exposure Point Concentration Summary** 

### LIST OF TABLES RAGS PART D TABLE 3 MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

### Table No.

3.1.RME	Unpaved Surface Soil - North Waterfront
3.2.RME	Surface Soil - North Waterfront
3.3.RME	Subsurface Soil - North Waterfront
3.4.RME	Unpaved Surface Soil - Central Shipyard
3.5.RME	Surface Soil - Central Shipyard
3.6.RME	Subsurface Soil - Central Shipyard
3.7.RME	Unpaved Surface Soil - Former Building 234
3.8.RME	Surface Soil - Former Building 234
3.9.RME	Surface Soil - PCB Removal Area
3.10.RME	Unpaved Surface Soil - PCB Removal Area

## TABLE 3.1.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of	Units	Arithmetic	95% UCL	Maximum Concentration			Exposure Point Concentration	
·	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale
Unpaved	Aluminum	mg/kg	5260	6680 (L)	9650	6680	mg/kg	95% Modified-t UCL	ProUCL 4.1.01
North Waterfront	Arsenic	mg/kg	4.58	6.21 (N)	9.81	6.21	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
Surface Soil	Manganese	mg/kg	171	229 (N)	337	229	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma

L = Lognormal

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

# TABLE 3.2.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of	Units	Arithmetic	95% UCL	Maximum Concentration	<u> </u>		Exposure Point Concentration	
	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale
North Waterfront	Aluminum	mg/kg	5690	6470 (G)	9650	6470	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01
	Arsenic	mg/kg	4.86	5.76 (G)	10.9	5.76	mg/kg	95% KM (BCA) UCL	ProUCL 4.1.01
	Manganese	mg/kg	211	255 (G)	340	255	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

## TABLE 3.3.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Subsurface Soil

Exposure Medium: Subsurface Soil

Exposure Point	Chemical of	Units	Arithmetic	95% UCL	Maximum Concentration			Exposure Point Concentration	
	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale
North Waterfront	Arsenic	mg/kg	6.1	7.0 (NP)	16.6	7.0	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Manganese	mg/kg	210	248 (G)	549	248	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

## TABLE 3.4.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
Unpaved Central Shipyard	Aluminum	mg/kg	(1)	(1)	13,100	13,100	mg/kg	Maximum Detected Concentration	(1)

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

# TABLE 3.5.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
Cental Shipyard	Aluminum	mg/kg	10,900	13,400 (N)	13,200	13,200	mg/kg	Maximum	(1)

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) Calculated 95% UCL exceeds the maximum concentration. Maximum concentration used as the EPC.

## TABLE 3.6.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Subsurface Soil

Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
Cental Shipyard	Manganese	mg/kg	336	382 (N)	612	382	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

### TABLE 3.7.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of	Units	Arithmetic	95% UCL	Maximum Concentration			Exposure Point Concentration	
	Potential Concern		Mean	(Distribution)	(Qualifier)	Value	Units	Statistic	Rationale
1									
Unpaved Building 234	Aluminum	mg/kg	7570	10200 (N)	11300	10200	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

1 There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

2 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.

U.S. EPA, 1994:Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

### TABLE 3.8.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
Building 234	Aluminum	mg/kg	7360	9570 (N)	11300	9570	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

- 1 There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.
- 2 The calculated 95% UCL exceeds the maximum concentration. The maximum concentration was used as the EPC.
- 3 Mean concentration is used as exposure point concentration for evaluating exposures to lead.
- U.S. EPA, 1994:Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

## TABLE 3.9.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
Unpaved PCB	Aluminum	mg/kg	(1)	(1)	12,300	12,300	mg/kg	Maximum Detected Concentration	(1)
Removal Area	Chromium	mg/kg	(1)	(1)	15.8 J	15.8	mg/kg	Maximum Detected Concentration	(1)

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

### TABLE 3.10.RME EXPOSURE POINT CONCENTRATION SUMMARY REASONABLE MAXIMUM EXPOSURE FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Value	Units	Exposure Point Concentration Statistic	Rationale
PCB Removal Area	Aluminum	mg/kg	(1)	(1)	12,300	12,300	mg/kg	Maximum Detected Concentration	(1)
	Chromium	mg/kg	(1)	(1)	15.8 J	15.8	mg/kg	Maximum Detected Concentration	(1)

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

- (1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.
- (2) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

### RAGS Part D Table 7

**Calculation of Cancer Risks and Non-Cancer Hazards** 



### LIST OF TABLES RAGS PART D TABLE 7 - NORTH WATERFRONT CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.	
	Reasonable Maximum Exposures
7.1.RME	Current Adolescent Trespassers - North Waterfront
7.2.RME	Current Adult Trespassers - North Waterfront
7.3.RME	Current Industrial Workers - North Waterfront
7.4.RME	Future Adolescent Trespassers - North Waterfront
7.5.RME	Future Adult Trespassers - North Waterfront
7.6.RME	Future Industrial Workers - North Waterfront
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - North Waterfront
7.9.RME	Hypothetical Adult Residents - North Waterfront

### TABLE 7.1.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Heceptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	cer Risk Calcula	ations			Non-Ca	ncer Hazard C	alculations	
	The state of the s			Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposu	e Concentration	Rf.	D/RfC	Hazard Quotien
					i		Value	Units	Value	Units	1	Value	Units	Value	Units	1
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6,680	mg/kg	2.5E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.8E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
				Arsenic	6.21	mg/kg	2.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.5E-07	1.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005
				Manganese	229	mg/kg	8.6E-06	(mg/kg/day)	NA	(mg/kg/day)-1		6.0E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003
			Exp. Route Total			_					3.5E-07					0.010
			Dermal	Aluminum	6,680	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	6.21	mg/kg	1.5E-07	(mg/kg/day)	1.5E+00	(mg/kg/day).1	2.3E-07	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total								2.3E-07					0.004
	1	Exposure Point Total	•								5.8E-07					0.01
	Exposure Medium Total			, ,							5.8E-07					0.01
	Air	North Waterfront	Inhalation	Aluminum	6.1E-7	mg/m³	1.9E-09	(mg/m³)	NA .	(ug/m <sup>3</sup> )-1		1.3E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000003
				Arsenic	5.6E-10	mg/m³	1.8E-12	(mg/m³)	4.3E-03	(ug/m³)-1	7.6E-12	1.2E-11	(mg/m³)	1.5E-05	(mg/m³)	8.2E-7
		1		Manganese	2.1E-8	mg/m³	6.5E-11	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		4.6E-10	(mg/m³)	5.0E-05	(mg/m <sup>3</sup> )	0.000009
			Exp. Route Total								7.6E-12					0.00001
		Exposure Point Total									7.6E-12					0.00001
	Exposure Medium Total										7.6E-12					0.00001
Medium Total											5.8E-07					0.01
			<del></del>					Total of	Receptor Risks	Across All Media	5.8E-07	T	Total of Rec	eptor Hazards	Across All Media	

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guldance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.2.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	cer Risk Calcula	tions		i	Non-Ca	ncer Hazard Ca	alculations	
		1		Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/L	Jnit Risk	Cancer Risk	Intake/Exposur	e Concentration	Rit	D/RfC	Hazard Quotier
							Value	Units	Value	Units		Value	Units	Value	Units	1
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6,680	mg/kg	3.6E-04	(mg/kg/day)	NA .	(mg/kg/day)		1.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.001
				Arsenic	6.21	mg/kg	3.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	5.0E-07	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				Manganese	229	mg/kg	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)		4.3E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.002
			Exp. Route Total								5.0E-07					0.007
			Dermal	Aluminum	6,680	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	6.21	mg/kg	4.0E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	6.0E-08	1.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0005
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
		1	Exp. Route Total								6.0E-08					0.0005
		Exposure Point Total	·								5.6E-07					0.007
	Exposure Medium Total										5.6E-07					0.007
	Air	North Waterfront	Inhalation	Aluminum	6.1E-7	mg/m <sup>3</sup>	3.8E-09	(mg/m³)	NA	(ug/m <sup>3</sup> ).1		1.3E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000003
				Arsenic	5.6E-10	mg/m³	3.5E-12	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.5E-11	1.2E-11	(mg/m³)	1.5E-05	(mg/m³)	8.2E-7
				Manganese	2.1E-8	mg/m³	1.3E-10	(mg/m³)	, NA	(ug/m³) <sup>-1</sup>		4.6E-10	(mg/m³)	5.0E-05	(mg/m³)	0.000009
			Exp. Route Total								1.5E-11					0.00001
		Exposure Point Total									1.5E-11					0.00001
	Exposure Medium Total		7								1.5E-11		•			0.00001
Medium Total											5.6E-07					0.007
								Total of	Receptor Risks	Across All Media	5.6E-07		Total of Rec	eptor Hazards	Across All Media	0.007

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.3.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	itions			Non-Ca	ncer Hazard Ca	alculations	
				Potential Concern	Value	Units	Intake/Exposul	e Concentration	CSF/I	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rff	D/RfC	Hazard Quotier
							Value	Units	Value	Units	1	Value	Units	Value	Units	
urtace Soil	Surface Soil	North Waterfront	ingestion	Aluminum	6,680	mg/kg	2.3E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		6.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.007
				Arsenic	6.21	mg/kg	2.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.3E-06	6.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Manganese	229	mg/kg	8.0E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.009
			Exp. Route Total								3.3E-06					0.04
			Dermal	Aluminum	6,680	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	-
				Arsenic	6.21	mg/kg	4.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	6.4E-07	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total								6.4E-07					0.004
		Exposure Point Total	·								3.9E-06					0.04
	Exposure Medium Total										3.9E-06					0.04
	Air	North Waterfront	Inhalation	Aluminum	6.1E-7	mg/m <sup>3</sup>	5.0E-08	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		1.4E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00003
				Arsenic	5.6E-10	mg/m <sup>3</sup>	4.6E-11	(mg/m³)	4.3E-03	(ug/m³) <sup>-1</sup>	2.0E-10	1.3E-10	(mg/m³)	1.5E-05	(mg/m³)	0.000009
				Manganese	2.1E-8	mg/m <sup>3</sup>	1.7E-09	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		4.8E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00010
			Exp. Route Total								2.0E-10					0.0001
		Exposure Point Total									2.0E-10					0.0001
	Exposure Medium Total						}				2.0E-10					0.0001
Medium Total											3.9E-06					0.04
								Total of	Receptor Risks	Across All Media	3.9E-06	1	Total of Rec	eptor Hazards	Across All Media	0.04

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 7.4.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calculi	ations			Non-Ca	ncer Hazard C	alculations	
	1			Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotier
						i	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6,470	mg/kg	2.4E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.7E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
	Į.			Arsenic	5.76	mg/kg	2.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.2E-07	1.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005
	Į			Manganese	255	mg/kg	9.6E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		6.7E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003
	į.		Exp. Route Total				1			•	3.2E-07					0.010
	i		Dermal	Aluminum	6,470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	5.76	mg/kg	1.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	2.1E-07	1.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.003
			L	Manganese	255	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
	į		Exp. Route Total								2.1E-07					0.003
	Į.	Exposure Point Total									5.4E-07		·			0.01
	Exposure Medium Total	da									5.4E-07					0.01
	Air	North Waterfront	Inhalation	Aluminum	5.9E-7	mg/m <sup>3</sup>	1.8E-09	(mg/m³)	NA	(ug/m³)-1		1.3E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000003
				Arsenic	5.2E-10	mg/m <sup>3</sup>	1.6E-12	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> )-1	7.1E-12	1.1E-11	(mg/m³)	1.5E-05	(mg/m³)	7.7E-7
				Manganese	2.3E-8	mg/m <sup>3</sup>	7.3E-11	(mg/m <sup>3</sup> )	NA	(ug/m³)-1		5.1E-10	(mg/m³)	5.0E-05	(mg/m <sup>3</sup> )	0.00001
			Exp. Route Total								7.1E-12					0.00001
		Exposure Point Total									7.1E-12					0.00001
	Exposure Medium Total	A					1				7.1E-12					0.00001
Medium Total											5.4E-07					0.01
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Arsenic	7.00	mg/kg	2.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	3.9E-07	1.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.006
	į.		-	Manganese	248	mg/kg	9.3E-06	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		6.5E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003
	İ		Exp. Route Total	1	-						3.9E-07	1				0.009
	i		Dermal	Arsenic	7.00	mg/kg	1.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	2.6E-07	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
		1	Exp. Route Total								2.6E-07					0.004
		Exposure Point Total		<u> </u>			1				6.5E-07					0.01
	Exposure Medium Total	t							<del></del>		6.5E-07					0.01
	Air	North Waterfront	Inhalation	Arsenic	6.4E-10	mg/m <sup>3</sup>	2.0E-12	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> )-1	8.6E-12	1.4E-11	(mg/m <sup>3</sup> )	1.5E-05	(mg/m <sup>3</sup> )	9.3E-7
				Manganese	2.3E-8	mg/m <sup>3</sup>	7.1E-11	(mg/m³)	NA	(ug/m³)-1		4.9E-10	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	0.000010
		1	Exp. Route Total	1							8.6E-12	1				0.00001
		Exposure Point Total	3.4	II			<del></del>				8.6E-12					0.00001
	Exposure Medium Total	Exposure Form Total					1				8.6E-12	i				0.00001
Medium Total	Exposure Medium Fotal										6.5E-07	i				0.01
Medium i otal									Receptor Risks		1.2E-06				Across All Media	0.03

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guldance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 7.5.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	]	Car	cer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	
	1			Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/I	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotie
							Value	Units	Value	Units	]	Value	Units	Value	Units	1
face Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6,470	mg/kg	3.5E-04	(mg/kg/day)	NA	(mg/kg/day)-1		1.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.001
	{			Arsenic	5.76	mg/kg	3.1E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	4.6E-07	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				Manganese	255	mg/kg	1.4E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.8E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.002
	{		Exp. Route Total								4.6E-07					0.007
	(		Dermal	Aluminum	6,470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
	i			Arsenic	5.76	mg/kg	3.7E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	5.6E-08	1.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0004
				Manganese	255	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total				1				5.6E-08					0.0004
		Exposure Point Total		·			1				5.2E-07					0.007
	Exposure Medium Total	And the second s									5.2E-07					0.007
	Air	North Waterfront	Inhalation	Aluminum	5.9E-7	mg/m³	3.7E-09	(mg/m <sup>3</sup> )	NA	(ug/m³)-1		1.3E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000003
			ĺ	Arsenic	5.2E-10	mg/m³	3.3E-12	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.4E-11	1.1E-11	(mg/m³)	1.5E-05	(mg/m³)	7.7E-7
			Ĭ	Manganese	2.3E-8	mg/m <sup>3</sup>	1.5E-10	(mg/m <sup>3</sup> )	NA	(ug/m <sup>3</sup> )-1		5.1E-10	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	0.00001
		1	Exp. Route Total								1.4E-11					0.00001
		Exposure Point Total					i				1.4E-11					0.00001
	Exposure Medium Total	<u> </u>	<del> </del>			**	<u> </u>				1.4E-11			•		0.00001
Medium Total											5.2E-07					0.007
ibsurface Soll	Subsurface Soil	North Waterfront	Ingestion	Arsenic	7.00	mg/kg	3.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	5.6E-07	1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				Manganese	248	mg/kg	1.3E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.7E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.002
			Exp. Route Total	i			Ì		ı.	1 3 3 2	5.6E-07	ì				0.006
			Dermai	Arsenic	7.00	mg/kg	4.5E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	6.7E-08	1.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0005
				Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total	1	•		<b>†</b>	1		1.1.3.3.3.	6.7E-08	i				0.0005
		Exposure Point Total	<u> </u>								6.3E-07					0.007
	Exposure Medium Total										6.3E-07				····	0.007
	Air	North Waterfront	Inhalation	Arsenic	6.4E-10	rng/m <sup>3</sup>	4.0E-12	(mg/m³)	4.3E-03	(ug/m³)·1	1.7E-11	1.4E-11	(mg/m <sup>3</sup> )	1.5E-05	(mg/m³)	9.3E-7
	[ · · · ·	I TOTAL TRAINS THE	I maiaton	Manganese	2.3E-8	mg/m³	1.4E-10	(mg/m³)	NA NA	(ug/m³)·1		4.9E-10	(mg/m³)	5.0E-05	(mg/m³)	0.000010
			Exp. Route Total		2.02.0	9/111	1	1 (9)		(~g····/	1.7E-11		(9)		,,	0.00001
		Exposure Point Total	LAP. House Total	J			<del> </del>				1.7E-11	<del></del>		*		0.00001
	Exposure Medium Total	xposure r on it rotal					<del> </del>				1.7E-11					0.00001
Medium Total	Exposure Medium Lota)						<del> </del>				6.3E-07					0.0007
Medium i otal							ـــــالـ			Across All Media	1.2E-06	<u> </u>	Total of Rec			0.007

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.6.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timetrame: Future

Receptor Population: Industrial Workers

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	1	Cai	ncer Risk Calcul	ations			Non-Ca	ncer Hazard C	alculations	
	1	ļ ·	· ·	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	BI	D/RfC	Hazard Quotie
							Value	Units	Value	Units		Value	Units	Value	Units	1
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6,470	mg/kg	2.3E-03	(mg/kg/day)	NA NA	(mg/kg/day)-1		6.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.006
		i		Arsenic	5.76	mg/kg	2.0E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) 1	3.0E-06	5.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
		i		Manganese	255	mg/kg	8.9E-05	(mg/kg/day)	NA	(mg/kg/day)		2.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.01
		i	Exp. Route Total								3.0E-06	]				0.04
		ł	Dermal	Aluminum	6,470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Arsenic	5.76	mg/kg	4.0E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	6.0E-07	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				Manganese	255	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Houte Total								6.0E-07					0.004
		Exposure Point Total									3.6E-06					0.04
	Exposure Medium Total										3.6E-06					0.04
	Air	North Waterfront	Inhalation	Aluminum	5.9E-7	mg/m <sup>3</sup>	4.8E-08	(mg/m³)	NA NA	(ug/m³)·1		1.3E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00003
				Arsenic	5.2E-10	mg/m³	4.3E-11	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> )·1	1.8E-10	1.2E-10	(mg/m³)	1.5E-05	(mg/m³)	0.000008
		•		Manganese	2.3E-8	mg/m³	1.9E-09	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		5.3E-09	(mg/m³)	5.0E-05	(mg/m³)	0.0001
			Exp. Route Total	1					· <del>-</del>		1.8E-10					0.0001
		Exposure Point Total									1.8E-10	1				0.0001
	Exposure Medium Total					-					1.8E-10					0.0001
Medium Total		· · · · · · · · · · · · · · · · · · ·									3.6E-06					0.04
Subsurface Soil	Subsurface Soil	North Weterfront	Ingestion	Arsenic	7.00	mg/kg	2.4E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	3.7E-06	6.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
0000011000 0011	5655411455 5511			Manganese	248	mg/kg	8.7E-05	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		2.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.01
			Exp. Route Total	1				1			3.7E-06	1				0.03
			Dermal	Arsenic	7.00	mg/kg	4.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	7.3E-07	1.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005
			Joanna	Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total	Manganoso		199	1	(557)	1	1_(g.x.g.day)	7.3E-07				1	0.005
		Exposure Point Total	Exp. Hodie Total	l			<del>                                     </del>				4.4E-06	i				0.04
1	Exposure Medium Total	Exposure Point Total								<del></del>	4.4E-06	<del> </del>				0.04
	Exposure Medium Total	North Waterfront	Inhalation	Arsenic	6.4E-10	mg/m³	5.2E-11	(mg/m <sup>3</sup> )	4.3E-03	(ug/m³) <sup>-1</sup>	2.2E-10	1.5E-10	(ma/m³)	1.5E-05	(mg/m³)	0.000010
	All	NOTH WATERFOR	milatation	Manganese	2.3E-8	mg/m <sup>3</sup>	1.8E-09	(mg/m³)	NA NA	(ug/m³) <sup>-1</sup>	2.22-10	5.1E-09	(mg/m³)	5.0E-05	(mg/m³)	0.0001
			Exp. Route Total	manganese	1 2.31.0	mg/m	1	(///g/111)	1 ,47	(ugm)	2.2E-10	<del> </del>	1 (9/		, (y)	0.0001
		Francisco Delet Tetal	Exp. Houre Total	<u> </u>			<del> </del>				2.2E-10		*		· · · · · · · · · · · · · · · · · · ·	0.0001
	<u> </u>	Exposure Point Total					<del></del>				2.2E-10	<del> </del>	<del></del>			0.0001
	Exposure Medium Total	······································									4.4E-06	<del></del>				0.0001
Medium Total							<u> </u>		72			<del></del>	T-1-1-75		A AN M. P.	
								Total o	i Heceptor Risks	Across All Media	8.0E-06		lotal of Rec	eptor Hazards	Across All Media	0.08

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.7 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	_ E	PC		Car	ncer Risk Calcula	ations		À	Non-Ca	ncer Hazard C	alculations	
	'	, and the second		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotier
			_ [				Value	Units	Value	Units		Value	Units	Value	Units	1
Surface Soil	Surface Soil	North Waterfront	Ingestion	Alumhum	6,470	mg/kg	1.6E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.1E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
	ł		İ	Arsenic	5.76	mg/kg	1.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.1E-07	9.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
		1		Manganese	255	mg/kg	6.1E-06	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		4.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
	Ĭ		Exp. Route Total								2.1E-07					0.06
	1		Dermal	Aluminum	6,470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
	l	1		Arsenic	5.76	mg/kg	1.2E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.9E-08	8.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.003
	1			Manganese	255	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
	l l		Exp. Route Total								1.9E-08	<u> </u>				0.003
	· ·	Exposure Point Total		<del></del>							2.3E-07					0.06
	Exposure Medium Total										2.3E-07					0.06
	Air	North Waterfront	Inhalation	Aluminum	0.005	mg/m³	7.8E-06	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		5.5E-04	(mg/m³)	5.0E-03	(mg/m³)	0.1
		i		Arsenic	4.1E-6	mg/m <sup>3</sup>	7.0E-09	(mg/m³)	4.3E-03	(ug/m³)-1	3.0E-08	4.9E-07	(mg/m³)	1.5E-05	(mg/m³)	0.03
	1			Manganese	1.8E-4	mg/m <sup>3</sup>	3.1E-07	(mg/m³)	NA NA	(ug/m³)-1		2.2E-05	(mg/m³)	5.0E-05	(mg/m³)	0.4
	1		Exp. Route Total		•						3.0E-08	]				0.6
		Exposure Point Total									3.0E-08					0.6
	Exposure Medium Total						i			_	3.0E-08				(mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/m³) (mg/m³) (mg/m²) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	0.6
Medium Total											2.6E-07					0.6
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Arsenic	7.00	mg/kg	1.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.5E-07	1.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04
		1		Manganese	248	mg/kg	5.9E-06	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		4.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
			Exp. Route Total								2.5E-07					0.06
I			Dermal	Arsenic	7.00	mg/kg	1.5E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	2.3E-08	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total		-		1				2.3E-08	1				0.004
		Exposure Point Total					1				2.7E-07					0.06
	Exposure Medium Total										2.7E-07					0.06
	Air	North Waterfront	Inhalation	Arsenic	5.0E-6	mg/m³	8.5E-09	(mg/m³)	4.3E-03	(ug/m³)·1	3.6E-08	5.9E-07	(mg/m³)	1.5E-05	(mg/m³)	0.04
				Manganese	1.8E-4	mg/m³	3.0E-07	(mg/m³)	NA	(ug/m <sup>3</sup> )·1		2.1E-05	(mg/m³)	5.0E-05	(mg/m³)	0.4
			Exp. Route Total								3.6E-08	1				0.5
		Exposure Point Total		P							3.6E-08					0.5
	Exposure Medium Total	1									3.6E-08					0.5
Medium Total	Expects a Michigan Total	<del></del>						***************************************			3.1E-07					0.5
Medidili Total						_				Across All Media	5.7E-07				Across All Media	1.2

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.8.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	ations			Non-Ca	ncer Hazard C	alculations	
			1	Potential Concern	Vatue	Units	Intake/Exposu	re Concentration	CSF/I	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotie
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6,470	mg/kg	7.1E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		8.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.08
	ı	1	Ī	Arsenic	5.76	mg/kg	6.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	9.5E-06	7.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.2
	i	l		Manganese	255	mg/kg	2.8E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.3E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.1
	l	1	Exp. Route Total				1				9.5E-06					0.5
	ļ	1	Dermal	Aluminum	6,470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
		ļ		Arsenic	5.76	mg/kg	5.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)*1	8.0E-07	6.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
	}			Manganese	255	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
	}		Exp. Route Total								8.0E-07					0.02
	j	Exposure Point Total									1.0E-05					0.5
	Exposure Medium Total										1.0E-05					0.5
	Air	North Waterfront	Inhalation	Aluminum	5.9E-7	mg/m <sup>3</sup>	4.8E-08	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		5.6E-07	(mg/m³)	5.0E-03	(mg/m³)	0.0001
			İ	Arsenic	5.2E-10	mg/m <sup>3</sup>	4.3E-11	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.9E-10	5.0E-10	(mg/m <sup>3</sup> )	1.5E-05	(mg/m³)	0.00003
			i	Manganese	2.3E-8	mg/m <sup>3</sup>	1.9E-09	(mg/m³)	NA	(ug/m³)		2.2E-08	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	0.0004
			Exp. Route Total	1	•						1.9E-10				-	0.0006
		Exposure Point Total					1				1.9E-10					0.0006
	Exposure Medium Total			·			1				1.9E-10	ĺ				0.0006
Medium Total											1.0E-05					0.5
Subsurtace Soil	Subsurface Soil	North Waterfront	Ingestion	Arsenic	7.00	mg/kg	7.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	1.2E-05	8.9E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.3
				Manganese	248	mg/kg	2.7E-04	(mg/kg/day)	NA	(mg/kg/day) 1		3.2E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.1
			Exp. Route Total		•					• • • • • • • • • • • • • • • • • • • •	1.2E-05	Ì				0.4
			Derma!	Arsenic	7.00	mg/kg	6.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	9.7E-07	7.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
				Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
		İ	Exp. Route Total							, , , , , , , , , , , , , , , , , , , ,	9.7E-07					0.03
		Exposure Point Total		*I							1.2E-05					0.5
	Exposure Medium Total	1									1.2E-05					0.5
	Air	North Waterfront	Inhalation	Arsenic	6.4E-10	mg/m <sup>3</sup>	5.2E-11	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> ) <sup>-1</sup>	2.2E-10	6.1E-10	(mg/m³)	1.5E-05	(mg/m³)	0.00004
			1	Manganese	2.3E-8	mg/m³	1.9E-09	(mg/m³)	NA	(ug/m³)-1		2.2E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0004
			Exp. Route Total	<del>                                     </del>		,	1	1		1	2.2E-10	i				0.0005
		Exposure Point Total	1				<del>                                     </del>				2.2E-10					0.0005
	Exposure Medium Total						<del> </del>				2.2E-10					0.0005
Medium Total	Exposure interiori Total						<del> </del>				1.2E-05					0.5
wedidii 10tal					<u> </u>					Across All Media	2.3E-05		Total of Rec			0.9

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.9.FIME

### CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

### REASONABLE MAXIMUM EXPOSURES

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Ca	ncer Risk Calcula	itions			Non-Ca	ncer Hazard C	alculations	
		,		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Jnit Risk	Cancer Risk	Intake/Exposu	e Concentration	Rfi	D/RfC	Hazard Quotien
					i		Value	Units	Value	Units	1	Value	Units	Value	Units	1
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6,470	mg/kg	3.0E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		8.9E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.009
				Arsenic	5.76	mg/kg	2.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	4.1E-06	7.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
				Manganese	255	mg/kg	1.2E-04	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		3.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.01
			Exp. Route Total		•	-	li .				4.1E-06					0.05
			Dermal	Aluminum	6,470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			1	Arsenic	5.76	mg/kg	3.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	4.9E-07	9.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.003
			i	Manganese	255	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total		•	•					4.9E-07					0.003
	1	Exposure Point Total									4.5E-06					0.05
	Exposure Medium Total						<u> </u>				4.5E-06					0.05
	Air	North Waterfront	Inhalation	Aluminum	5.9E-7	mg/m³	1.9E-07	(mg/m³)	NA NA	(ug/m <sup>3</sup> )-1		5.6E-07	(mg/m <sup>3</sup> )	5.0E-03	(mg/m³)	0.0001
				Arsenic	5.2E-10	mg/m³	1.7E-10	(mg/m³)	4.3E-03	(ug/m <sup>3</sup> )-1	7.4E-10	5.0E-10	(mg/m <sup>3</sup> )	1.5E-05	(mg/m³)	0.00003
				Manganese	2.3E-8	mg/m³	7.6E-09	(mg/m <sup>3</sup> )	NA	(ug/m <sup>3</sup> )-1		2.2E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0004
			Exp. Route Total	i -		- <del></del>	·	·	•		7.4E-10					0.0006
		Exposure Point Total	<u> </u>	\							7.4E-10					0.0006
	Exposure Medium Total			***							7.4E-10					0.0006
Medium Total	CAPOSATO INCUIANT TOTAL					:	<del>                                     </del>		····		4.5E-06		****		ItD/RIC Units (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/may) (mg/may) (mg/may) (mg/may) (mg/may) (mg/may)	0.05
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Arsenic	7.00	mg/kg	3.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)-1	4.9E-06	9.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
Substitude Soli	Caccanada San	11010111101011	geoo.	Manganese	248	ma/ka	1,2E-04	(mg/kg/day)	NA.	(mg/kg/day)		3.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.01
	1		Exp. Route Total	1			1		·	1 (	4.9E-06					0.05
	]		Dermal	Arsenic	7.00	mg/kg	3.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) <sup>-1</sup>	5.9E-07	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
	1		Domina	Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04		
			Exp. Route Total	Manganooo		1		(gg2)		1 (119119 513)	5.9E-07		1		1 . 5 . 5	0.004
		Exposure Point Total	Exp. House Fotal			-					5.5E-06	<del></del>				0.05
	Exposure Medium Total	Cxposore i onit rotar					<del></del>	<del></del>			5.5E-06					0.05
	Air	North Waterfront	Inhalation	Arsenic	6.4E-10	mg/m <sup>3</sup>	2.1E-10	(mg/m³)	4.3E-03	(ug/m³)-1	9.0E-10	6.1E-10	(mg/m³)	1.5E-05	(mg/m³)	0.00004
	[Air	INORTH WATERHOUT	imalation	Manganese	2.3E-8	mg/m <sup>3</sup>	7.4E-09	(mg/m³)	NA	(ug/m³)-1	3.02-10	2.2E-08	(mg/m³)	5.0E-05		0.0004
			Exp. Route Total	Waligaliese	2.32-0	ing/iii_	7,42-03	1 (1119/111)		(09/11)	9.0E-10		1 ()		(9)	0.0005
	j	5 D-(-1 T-1-)	Exp. noute Total								9.0E-10					0.0005
		Exposure Point Total		<del></del>	·		<del> </del>				9.0E-10					0.0005
	Exposure Medium Total					<del></del>										0.0005
Medium Total							<u> </u>					<u> </u>				
Medium Total				<u> </u>	Total c	f Receptor Risks	Across All Media	5.5E-06 1.0E-05	L	Total of Rec	eptor Hazards	Across All Media	_			

### Nieter

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



### LIST OF TABLES RAGS PART D TABLE 7 - CENTRAL SHIPYARD CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.	
	Reasonable Maximum Exposures
7.1.RME	Current Adolescent Trespassers - Central Shipyard
7.2.RME	Current Adult Trespassers - Central Shipyard
7.3.RME	Current Industrial Workers - Central Shipyard
7.4.RME	Future Adolescent Trespassers - Central Shipyard
7.5.RME	Future Adult Trespassers - Central Shipyard
7.6.RME	Future Industrial Workers - Central Shipyard
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - Central Shipyard
7.9.RME	Hypothetical Adult Residents - Central Shipyard

### TABLE 7.1 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVISTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	cer Risk Calcu	lations			Non-Ca	ncer Hazard C	alculations	
			1	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF	/Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf.	D/RfC	Hazard Quotient
		ł	1				Value	Units	Value	Units	1	Value	Units	Value	Units	1
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,100	mg/kg	4.9E-04	(mg/kg/day)	NA	(mg/kg/day)-1		3.4E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
	•		Exp. Route Total				1									0.003
			Dermal	Aluminum	13,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total									l				
		Exposure Point Total		· · · ·								}				0.003
	Exposure Medium Total						1									0.003
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m³	3.7E-09	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		2.6E-08	(mg/m³)	5.0E-03	(mg/m <sup>3</sup> )	0.000005
			Exp. Route Total													0.000005
		Exposure Point Total														0.000005
	Exposure Medium Total											]				0.000005
Medium Total																0.003
								Total of	Receptor Risk	s Across All Media			Total of Fleo	eptor Hazards	Across All Media	0.003

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 7 2.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	1	Can	cer Risk Calcu	lations			Non-Ca	ncer Hazard Ca	alculations	
		1		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF	/Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfl	D/RfC	Hazard Quotient
					ŀ		Value	Units	Value	Units	1	Value	Units	Value	Units	1
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,100	mg/kg	7.0E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
			Exp. Route Total													0.002
			Dermal	Aluminum	13,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
		l	Exp. Route Total													]
		Exposure Point Total														0.002
	Exposure Medium Total															0.002
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m <sup>3</sup>	7.5E-09	(mg/m³)	NA	(ug/m³)·1		2.6E-08	(mg/m³)	5.0E-03	(mg/m³)_	0.000005
			Exp. Route Total													0.000005
		Exposure Point Total		•												0.000005
	Exposure Medium Total															0.000005
Medium Total																0.002
								Total of	Receptor Risk	s Across All Media			Total of Rec	eptor Hazards	Across All Media	0.002

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.3.RME CALCULATION OF CHEMICAL CANCER HISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calculi	ations		I				
				Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
	i						Value	Units	Value	Units	1	Value	Units	Value	Units	l
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,100	mg/kg	4.6E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
			Exp. Route Total	1	_											0.01
			Dermal	Aluminum	13,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
	-		Exp. Route Total													
		Exposure Point Total														0.01
	Exposure Medium Total	A														0.01
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m³	9.7E-08	(mg/m³)	NA	(ug/m³)-1		2.7E-07	(mg/m³)	5.0E-03	(mg/m <sup>3</sup> )	0.00005
			Exp. Route Total				J					}				0.00005
		Exposure Point Total	-													0.00005
	Exposure Medium Total															0.00005
Medium Total																0.01
								Total of	Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	0.01

### Motor:

<sup>1 -</sup> Mufagenic chemicals were evaluated in accordance with USEPA's Supplementel Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.4.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	l	Ca	ncer Risk Calcul	ations		Non-Cancer Hazard Calculations					
		· ·		Potential Concern	Value	Units	intake/Exposu	re Concentration	CSF/	Unit Risk	Cancer Risk			Rf	D/RIC	Hazard Quotient	
							Value	Units	Value	Units	1	Value	Units	Value	Units		
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,200	mg/kg	5.0E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003	
	ì	•	Exp. Route Total				l					][				0.003	
	i		Dermal	Atuminum	13,200	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)		
			Exp. Route Total					-									
		Exposure Point Total										l				0.003	
	Exposure Medium Total															0.003	
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m³	3.8E-09	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.6E-08	(mg/m³)	5.0E-03	(mg/m <sup>3</sup> )	0.000005	
			Exp. Route Total													0.000005	
	1	Exposure Point Total										1				0.000005	
	Exposure Medium Total															0.000005	
Medium Total												1				0.003	
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	1.4E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.0E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.004	
			Exp. Route Total									]				0.004	
			Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)		
			Exp. Route Total					·									
		Exposure Point Total														0.004	
	Exposure Medium Total															0.004	
	Air	Central Shipyard	Inhalation	Manganese	3.5E-8	mg/m³	1.1E-10	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		7.6E-10	(mg/m³)	5.0E-05	(mg/m³)	0.00002	
			Exp. Route Total									l	-			0.00002	
		Exposure Point Total														0.00002	
	Exposure Medium Total															0.00002	
Medium Total																0.004	
						•		Total o	Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	0.008	

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Cercinogens (2005).

### TABLE 7.5.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Ca	ncer Risk Calcul	ations						
			}	Potential Concern	Value	Units	Intake/Exposu	re Concentration		Unit Risk	Cancer Risk				D/RfC	Hazard Quotient
			}	l	.i		Value	Units	Value	Units	l	Value	Units	Value	Units	<u> </u>
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,200	mg/kg	7.1E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
			Exp. Route Total													0.002
			Dermai	Aluminum	13,200	mg/kġ	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total									l				
		Exposure Point Total														0.002
	Exposure Medium Total															0.002
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m³	7.5E-09	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		2.6E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000005
			Exp. Route Total	]												0.000005
		Exposure Point Total	·													0.000005
	Exposure Medium Total															0.000005
Medium Total					·											0.002
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	2.1E-05	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		7.2E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003
			Exp. Route Total													0.003
			Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total													
		Exposure Point Total										l				0.003
	Exposure Medium Total	-														0.003
	Air	Central Shipyard	Inhalation	Manganese	3.5E-8	mg/m <sup>3</sup>	2.2E-10	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		7.6E-10	(mg/m³)	5.0E-05	(mg/m <sup>3</sup> )	0.00002
			Exp. Route Total													0.00002
		Exposure Point Total	osure Point Total													0.00002
	Exposure Medium Total															0.00002
Medium Total																0.003
								Total o	of Receptor Risks	Across All Media	· · ·		Total of Rec	eptor Hazards	Across All Media	0.005

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<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.6 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Aduli

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	]	Car	ncer Risk Calcula	ations		Non-Cancer Hazard Calculations					
	1 "	]		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Unit Risk	Cancer Risk					Hazard Quotien	
							Value	Units	Value	Units		Value	Units	Value	Units	L	
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,200	mg/kg	4.6E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1,3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01	
			Exp. Route Total			-										0.01	
			Dermal	Aluminum	13,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)		
			Exp. Route Total													<u> </u>	
		Exposure Point Total														0.01	
	Exposure Medium Total															0.01	
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m³	9.8E-08	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.7E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00005	
			Exp. Route Total									]				0.00005	
		Exposure Point Total														0.00005	
	Exposure Medium Total															0.00005	
Medium Total																0.01	
Subsurface Soll	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	1.3E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.7E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02	
			Exp. Route Total							_		}				0.02	
			Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)		
			Exp. Floute Total													<u> </u>	
		Exposure Point Total														0.02	
	Exposure Medium Total															0.02	
	Air	Central Shipyard	Inhalation	Manganese	3.5E-8	rng/m <sup>3</sup>	2.8E-09	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		7.9E-09	(mg/m³)	5.0E-05	(mg/m <sup>3</sup> )	0.0002	
			Exp. Route Total													0.0002	
		Exposure Point Total														0.0002	
	Exposure Medium Total	Exposure Medium Total														0.0002	
Medium Total																0.02	
								Total of	Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	0.03	

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 7.7 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	lł .	Car	ncer Risk Calcula	ations		Non-Cancer Hazard Calculations					
	1	ĺ		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposure Concentration		Rf	D/RIC	Hazard Quotient	
	i						Value	Units	Value	Units	1	Value	Units	Value	Units	1	
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,200	mg/kg	3.2E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>	Ţ	2.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02	
		ł	Exp. Route Total													0.02	
			Dermal	Aluminum	13,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)		
			Exp. Route Total														
		Exposure Point Total					l.									0.02	
	Exposure Medium Total															0.02	
	Air	Central Shipyard		Aluminum	0.009	mg/m³	1.6E-05	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.1E-03	(mg/m³)	5.0E-03	(mg/m³)	0.2	
			Exp. Route Total													0.2	
	į.	Exposure Point Total			-											0.2	
	Exposure Medium Total															0.2	
Medium Total																0.2	
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	9.2E-06	(mg/kg/day)	NA	(mg/kg/day)-1		6.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03	
			Exp. Route Total													0.03	
		į	Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA.	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)		
			Exp. Route Total					•									
		Exposure Point Total														0.03	
	Exposure Medium Total											1				0.03	
	Air	Central Shipyard	Inhalation	Manganese	2.7E-4	mg/m <sup>3</sup>	4.6E-07	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		3.2E-05	(mg/m³)	5.0E-05	(mg/m³)	0.6	
			Exp. Route Total									]				0.6	
		Exposure Point Total														0.6	
	Exposure Medium Total	<del></del>											· ·			0.6	
Medium Total																0.7	
								Total o	f Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	0.9	

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 7.8.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Cai	ncer Risk Calcul	ations						
				Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
			,		ŀ		Value	Units	Value	Units	1	Value	Units	Value	Units	1
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,200	mg/kg	1.4E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>	*-	1.7E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.2
			Exp. Route Total				)									0.2
			Dermal	Aluminum	13,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total									l				
		Exposure Point Total														0.2
	Exposure Medium Total															0.2
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m <sup>3</sup>	9.9E-08	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		1.2E-06	(mg/m³)	5.0E-03	(mg/m³)	0.0002
		1	Exp. Route Total				<u> </u>									0.0002
	i	Exposure Point Total														0.0002
	Exposure Medium Total															0.0002
Medium Total																0.2
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	4.2E-04	(mg/kg/day)	NA	(mg/kg/day)		4.9E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.2
			Exp. Route Total				<u> </u>			<b></b>						0.2
			Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Floute Total													
		Exposure Point Total														0.2
	Exposure Medium Total															0.2
	Air	Central Shipyard	Inhalation	Manganese	3.5E-8	mg/m³	2.9E-09	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		3.3E-08	(mg/m <sup>3</sup> )	5.0E-05	(mg/m <sup>3</sup> )	0.0007
			Exp. Route Total									]				0.0007
		Exposure Point Total														0.0007
	Exposure Medium Total						Ĺ									0.0007
Medium Total																0.2
								Total o	f Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	0.4

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 7.9.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcul	ations		Non-Cancer Hazard Calculations				
		1		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Unit Risk	Cancer Risk			Hfl	D/RIC	Hazard Quotien
							Value	Units	Value	Units		Value	Units	Value	Units	1
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,200	mg/kg	6.2E-03	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		1.8E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
			Exp. Route Total													0.02
			Dermal	Aluminum	13,200	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Houte Total													
		Exposure Point Total														0.02
	Exposure Medium Total															0.02
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m³	3.9E-07	(mg/m <sup>3</sup> )	NA	(ug/m³)-1		1.2E-06	(mg/m³)	5.0E-03	(mg/m³)	0.0002
			Exp. Route Total									l				0.0002
	l	Exposure Point Total														0.0002
	Exposure Medium Total															0.0002
Medium Total											1					0.02
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	1.8E-04	(mg/kg/day)	NA.	(mg/kg/day)		5.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
		ı	Exp. Route Total													0.02
			Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total													
		Exposure Point Total														0.02
	Exposure Medium Total															0.02
	Air	Central Shipyard	Inhalation	Manganese	3.5E-8	mg/m <sup>3</sup>	1.1E-08	(mg/m³)	NA NA	(ug/m³) <sup>-1</sup>		3.3E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0007
			Exp. Route Total	]												0.0007
		Exposure Point Total														0.0007
	Exposure Medium Total															0.0007
Medium Total																0.02
		·						Total o	Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	0.04

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



#### LIST OF TABLES RAGS PART D TABLE 7 - FORMER BUILDING 234 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.	
	Reasonable Maximum Exposures
7.1.RME	Current Adolescent Trespassers - Central Shipyard
7.2.RME	Current Adult Trespassers - Central Shipyard
7.3.RME	Current Industrial Workers - Central Shipyard
7.4.RME	Future Adolescent Trespassers - Central Shipyard
7.5.RME	Future Adult Trespassers - Central Shipyard
7.6.RME	Future Industrial Workers - Central Shipyard
7.7.RMÉ	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - Central Shipyard
7.9.RMÉ	Hypothetical Adult Residents - Central Shipyard

# TABLE 7.1 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Ca	ncer Risk Calcu	lations			Non-Ca	ncer Hazard C	alculations	
}			1	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF	/Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Hf	D/RfC	Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	1 .
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	10,200	mg/kg	3.8E-04	(mg/kg/day)	NA	(mg/kg/day):1		2.7E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
			Exp. Route Total													0.003
			Dermal	Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total									)				
	ĺ	Exposure Point Total		***												0.003
	Exposure Medium Total	···														0.003
1	Air	Former Building 234	Inhalation	Aluminum	9.3E-7	mg/m³	2.9E-09	(mg/m³)	NA	(ug/m³)-1		2.0E-08	(mg/m³)	5.0E-03	(mg/m <sup>3</sup> )	0.000004
			Exp. Route Total									l				0.000004
		Exposure Point Total														0.000004
	Exposure Medium Total															0.000004
Medium Total																0.003
								Total o	f Receptor Risi	s Across All Media			Total of Flec	eptor Hazards.	Across All Media	0.003

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guldance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 7.2.RME

#### CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

#### REASONABLE MAXIMUM EXPOSURES

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	cer Risk Calcul	ations		1	Non-Ca	ncer Hazard C	alculations	
			ì	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfl	D/RfC	Hazard Quotient
				<u> </u>			Value	Units	Value	Units		Value	Units	Value	Units	]
Surface Soil	Surface Soll	Former Building 234	Ingestion	Aluminum	10,200	mg/kg	5.5E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.9E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
			Exp. Route Total									1			•	0.002
			Dermal	Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total									i				
		Exposure Point Total	·									ì				0.002
	Exposure Medium Total															0.002
	Air	Former Building 234	Inhalation	Aluminum	9.3E-7	mg/m³	5.8E-09	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.0E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000004
		l	Exp. Route Total									]				0.000004
		Exposure Point Total														0.000004
	Exposure Medium Total															0.000004
Medium Total													-			0.002
<del></del>								Total of	Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	0.002

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 7.3.RME

#### CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

#### REASONABLE MAXIMUM EXPOSURES

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current

Receptor Population: Industrial Workers

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	cer Risk Calcul	ations			Non-Ca	incer Hazard Ci	alculations	
	, i	· ·	1 '	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposu	e Concentration	Rff	D/RfC	Hazard Quotien
	ľ						Value	Units	Value	Units	1	Value	Units	Value	Units	1
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	10,200	mg/kg	3.6E-03	(mg/kg/day)	NA	(mg/kg/day)		1.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.010
			Exp. Route Total							-						0.010
			Dermal	Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total		•											
		Exposure Point Total														0.010
	Exposure Medium Total															0.010
	Air	Former Building 234	Inhalation	Aluminum	9.3E-7	mg/m <sup>3</sup>	7.6E-08	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.1E-07	(mg/m <sup>3</sup> )	5.0E-03	(mg/m³)	0.00004
			Exp. Route Total									<u> </u>				0.00004
		Exposure Point Total														0.00004
	Exposure Medium Total		**													0.00004
Medium Total																0.01
								Total of	Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	0.01

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 7.4.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPOHT, NEWPOHT, HHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	i .	Can	cer Risk Calcu	lations			Non-Ca	ncer Hazard Ca	alculations	
			i	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF	/Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
					1		Value	Units	Value	Units	1	Value	Units	Value	Units	1
Surface Soll	Surface Soil	Former Bullding 234	Ingestion	Aluminum	9,570	mg/kg	3.6E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>	i	2.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
			Exp. Route Total		•											0.003
			Derma!	Aluminum	9,570	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total													
		Exposure Point Total	•													0.003
	Exposure Medium Total															0.003
	Air	Former Building 234	Inhalation	Afuminum	8.7E-7	mg/m³	2.7E-09	(mg/m³)	NA	(ug/m³) <sup>-1</sup>	·-	1.9E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000004
			Exp. Route Total													0.000004
		Exposure Point Total	•													0.000004
	Exposure Medium Total															0.000004
Medium Total							]									0.003
								Total of	Receptor Risk	s Across All Media			Total of Rec	eptor Hazards	Across All Media	

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidence for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.5.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	er Risk Calcu	lations		l	Non-Ca	ncer Hazard Ca	alculations	
	1		1	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF	/Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rff	D/RfC	Hazard Quotient
						l	Value	Units	Value	Units	1	Value	Units	Value	Units	
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	9,570	mg/kg	5.1E-04	(mg/kg/day)	NA	(mg/kg/day) 1		1.8E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
			Exp. Route Total													0.002
			Dermal	Aluminum	9,570	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total				Ĺ									
		Exposure Point Total									· · · · · · · · · · · · · · · · · · ·					0.002
	Exposure Medium Total															0.002
	Air	Former Building 234	Inhalation	Aluminum	8.7E-7	mg/m³	5.4E-09	(mg/m³)	NA	(ug/m³)-1		1.9E-08	(mg/m³)	5.0E-03	(mg/m <sup>3</sup> )	0.000004
			Exp. Route Total									]				0.000004
		Exposure Point Total	.,													0.000004
	Exposure Medium Total															0.000004
Medium Total																0.002
								Total of	Receptor Risk	s Across All Media		<u> </u>	Total of Rec	eptor Hazards	Across All Media	0.002

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.6 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcu				Non-Ca	ncer Hazard C		
			1	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF	/Unit Hisk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
			i		ļ		Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	9,570	mg/kg	3.3E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		9.4E-03	(mg/kg/day)	1:0E+00	(mg/kg/day)	0.009
			Exp. Route Total									3				0.009
			Dermal	Aluminum	9,570	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total													
	L	Exposure Point Total			-							1				0.009
	Exposure Medium Total															0.009
	Air	Former Building 234	Inhalation	Aluminum	8.7E-7	mg/m³	7.1E-08	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.0E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00004
!			Exp. Route Total													0.00004
		Exposure Point Total		<del> </del>	,											0.00004
	Exposure Medium Total															0.00004
Medium Total							l:								`	0.009
								Total o	Receptor Risk	s Across All Media			Total of Rece	optor Hazards	Across All Media	0.009

Motor

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.7.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	er Risk Calc	ulations			Non-Ca	ncer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposu	re Concentration	CS	-/Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
					ŀ		Value	Units	Value	Units	1	Value	Units	Value	Units	1 .
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	9,570	mg/kg	2.3E-04	(mg/kg/day)	NA	(mg/kg/day)		1.6E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
			Exp. Route Total													0.02
			Dermal	Aluminum	9.570	mg/kg	0.0E+00	(mg/kg/day)	NΑ	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total													
		Exposure Point Total														0.02
	Exposure Medium Total	***************************************	•				I									0.02
	Air	Former Building 234	Inhalation	Aluminum	0.007	mg/m <sup>3</sup>	1.2E-05	(mg/m³)	NA	(ug/m³)-1		8.1E-04	(mg/m³)	5.0E-03	(mg/m³)	0.2
		<u></u>	Exp. Route Total							·						0.2
		Exposure Point Total														0.2
	Exposure Medium Total															0.2
Medium Total																0.2
								Total of	Receptor Ris	ks Across All Media			Total of Rec	eptor Hazards	Across All Media	0.2

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.8.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	icer Risk Calcul	ations			Non-Ca	ncer Hazard C	alculations	
	1	ĺ		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RIC	Hazard Quotien
				İ			Value	Units	Value	Units	1	Value	Units	Value	Units	1
urface Solf	Surface Soil	Former Building 234		Aluminum	9,570	mg/kg	1.0E-02	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>	I	1.2E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.1
	1	1	Exp. Route Total		•											0.1
	(		Dermal	Aluminum	9,570	mg/kg	0.0E+00	(mg/kg/day)	NA NA	(mg/kg/day) 1		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total													
		Exposure Point Total														0.1
	Exposure Medium Total															0.1
	Air	Former Building 234	Inhalation	Aluminum	8.7E-7	mg/m³	7.2E-08	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		8.3E-07	(mg/m³)	5.0E-03	(mg/m³)	0.0002
			Exp. Route Total													0.0002
		Exposure Point Total														0.0002
	Exposure Medium Total															0.0002
Medium Total																0.1
								Total of	Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	

<sup>1 -</sup> Mutagenic chemicats were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.9.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	icer Risk Calcu	lations			Non-Ca	ncer Hazard Ca	alculations	
		·		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF	/Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotient
	i						Value	Units	Value	Units	1	Value	Units	Value	Units	
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	9,570	mg/kg	4.5E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
			Exp. Route Total													0.01
			Dermal	Aluminum	9,570	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)-1		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			Exp. Route Total		*											
		Exposure Point Total					)									0.01
	Exposure Medium Total															0.01
	Air	Former Building 234	Inhalation	Aluminum	8.7E-7	mg/m³	2.9E-07	(mg/m³)	NA	(ug/m³)-1		8.3E-07	(mg/m³)	5.0E-03	(mg/m <sup>3</sup> )	0.0002
			Exp. Route Total							•			•			0.0002
		Exposure Point Total	•													0.0002
	Exposure Medium Total															0.0002
Medium Total																0.01
								Total of	Receptor Risk	s Across All Media			Total of Rec	eptor Hazards	Across All Media	0.01

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



#### LIST OF TABLES RAGS PART D TABLE 7 - SOUTH WATERFRONT CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.	
	Reasonable Maximum Exposures
7.1.RME	Future Adolescent Trespassers - South Waterfront
7.2.RME	Future Adult Trespassers - South Waterfront
7.3.RME	Future Industrial Workers - South Waterfront
7.4.RME	Current/Future Construction Workers - North Waterfront
7.5.RME	Hypothetical Child Residents - South Waterfront
7.6.RME	Hypothetical Adult Residents - South Waterfront

### TABLE 7.1.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe; Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Can	er Risk Calcul	ations			Non-Ca	ncer Hazard C	alculations	
				Potential Concern	Value	Units	Intake/Exposur	e Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Af	D/RfC	Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	1
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Manganese	692	mg/kg	2.6E-05	(mg/kg/day)	NA	(mg/kg/day)		1.8E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.008
			Exp. Route Total													0.008
		i	Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
		1	Exp. Route Total	i												
		Exposure Point Total														0.008
	Exposure Medium Total															0.008
	Air	South Waterfront	Inhalation	Manganese	6.3E-8	mg/m³	2.0E-10	(mg/m³)	NA	(ug/m³)-1		1.4E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00003
			Exp. Route Total													0.00003
		Exposure Point Total														0.00003
	Exposure Medium Total	J														0.00003
Medium Total																0.008
								Total of	Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	

Notos

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.2 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Heceptor Population: Trespassers Heceptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	1		ncer Risk Calcul	ations			Non-Ca	ncer Hazard C	alculations	
			1	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Hfl	D/RfC	Hazard Quotient
			1				Value	Units	Value	Units	1	Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Manganese	692	mg/kg	3.7E-05	(mg/kg/day)	NA	(mg/kg/day)-1		1.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005
			Exp. Route Total													0.005
		İ	Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
		l	Exp. Route Total													
		Exposure Point Total														0.005
	Exposure Medium Total															0.005
	Air	South Waterfront	Inhalation	Manganese	6.3E-8	mg/m <sup>3</sup>	3.9E-10	(mg/m³)	NA .	(ug/m³)·1		1.4E-09	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	0.00003
			Exp. Route Total													0.00003
		Exposure Point Total														0.00003
	Exposure Medium Total															0.00003
Medium Total																0.005
								Total o	Receptor Risks	Across All Media			Total of Rec	eptor Hazards .	Across All Media	0.005

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guldance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.3 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Industrial Workers

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chernical of	EI	PC	1	Car	cer Risk Calcu	lations		1	Non-Ca	ncer Hazard Ca	alculations	
	1			Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF	/Unit Risk	Cancer Risk	Intake/Exposur	e Concentration	Att	D/RfC	Hazard Quotient
				İ	1		Value	Units	Value	Units		Value	Units	Value	Units	1
Subsurface Soil	Subsurface Soil	South Waterfront	ingestion	Manganese	692	mg/kg	2.4E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		6.8E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03
			Exp. Route Total	1												0.03
ł			Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)_	
		L	Exp. Route Total													
		Exposure Point Total														0.03
	Exposure Medium Total															0.03
i	Air	South Waterfront	Inhalation	Manganese	6.3E-8	mg/m³	5.1E-09	(mg/m <sup>3</sup> )	NA	(ug/m³)-1		1.4E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0003
			Exp. Route Total													0.0003
		Exposure Point Total														0.0003
	Exposure Medium Total															0.0003
Medium Total												i				0.03
								Total of	Receptor Risk	s Across All Media		T	Total of Rec	eptor Hazards	Across All Media	0.03

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.4 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timetrame: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	Ε. Ε.	PC		Can	er Risk Calcul	ations		ł	Non-Ca	ncer Hazard Ca	alculations	
				Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfl	D/RfC	Hazard Quotient
		ł	1	1			Value	Units	Value	Units	1	Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Manganese	692	rng/kg	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)-1		1.2E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.05
		1	Exp. Route Total		•											0.05
			Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total							-						· ·
	ļ	Exposure Point Total									"					0.05
	Exposure Medium Total															0.05
	Air	South Waterfront	Inhalation	Manganese	4.9E-4	mg/m³	8.4E-07	(mg/m³)	NA	(ug/m <sup>3</sup> )-1	- *	5.9E-05	(mg/m³)	5.0E-05	(mg/m <sup>3</sup> )	1.2
			Exp. Route Total									]				1.2
		Exposure Point Total	•													1.2
	Exposure Medium Total															1.2
Medium Total																1.2
								Total of	Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	1.2

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.5.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	EI	PC		Cano	er Risk Calcu	ations			Non-Ca	ncer Hazard C	alculations	
	1 '	· ·		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF	/Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	RI	ID/RfC	Hazard Quotier
			ŀ				Value	Units	Value	Units		Value	Units	Value	Units	1
Subsurtace Soil	Subsurface Soil	South Waterfront	Ingestion	Manganese	692	mg/kg	7.6E-04	(mg/kg/day)	NA	(mg/kg/day) 1		8.8E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.4
			Exp. Route Total													0.4
			Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total													<u> </u>
		Exposure Point Total														0.4
	Exposure Medium Total															0.4
	Air	South Waterfront	Inhalation	Manganese	6.3E-8	mg/m³	5.2E-09	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		6.0E-08	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	0.001
			Exp. Route Total													0.001
		Exposure Point Total														0.001
	Exposure Medium Total															0.001
Medium Total	. '.															0.4
		*						Total of F	Receptor Risk	s Across All Media			Total of Rec	eptor Hazards	Across All Media	0.4

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.6.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	1	Can	er Risk Calcul	ations			Non-Ca	ncer Hazard C	alculations	
	·	·		Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	ID/RfC	Hazard Quotient
•	į	1		}		ļ	Value	Units	Value	Units	1	Value	Units	Value	Units	1
Subsurface Soll	Subsurface Soil	South Waterfront	Ingestion	Manganese	692	mg/kg	3.3E-04	(mg/kg/day)	NA	(mg/kg/day)-1		9.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04
ľ			Exp. Route Total	1												0.04
			Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	
			Exp. Route Total													
		Exposure Point Total		!									_			0.04
	Exposure Medium Total	.1.														0.04
	Air	South Waterfront	Inhalation	Manganese	6.3E-8	mg/m <sup>3</sup>	2.1E-08	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		6.0E-08	(mg/m <sup>3</sup> )	5.0E-05	(mg/m³)	0.001
ľ			Exp. Route Total													0.001
ı		Exposure Point Total		J				<del></del>								0.001
	Exposure Medium Total	<u></u>														0.001
Medium Total																0.04
								Total of	Receptor Risks	Across All Media			Total of Rec	eptor Hazards	Across All Media	

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

**PCB Removal Area** 

#### LIST OF TABLES RAGS PART D TABLE 7 - PCB REMOVAL AREA CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

# Table No. Reasonable Maximum Exposures 7.1.RME Current Adolescent Trespassers - PCB Removal Area 7.2.RME Current Adult Trespassers - PCB Removal Area 7.3.RME Current Industrial Workers - PCB Removal Area 7.4.RME Future Adolescent Trespassers - PCB Removal Area 7.5.RME Future Adult Trespassers - PCB Removal Area 7.6.RME Future Industrial Workers - PCB Removal Area 7.7.RME Current/Future Construction Workers - North Waterfront 7.8.RME Hypothetical Child Residents - PCB Removal Area 7.9.RME Hypothetical Adult Residents - PCB Removal Area

# TABLE 7.1 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcul	ations			Non-Ca	ncer Hazard C	alculations	
	1			Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfi	D/RfC	Hazard Quotient
	ļ						Value	Units	Value	Units		Value	Units	Value	Units	1
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12,300	mg/kg	4.6E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
				Chromium	15.8	mg/kg	1.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day).1	8.9E-07	4.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001
		l	Exp. Route Total		_						8.9E-07					0.005
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
			Exp. Route Total													
	į	Exposure Point Total	•								8.9E-07					0.005
	Exposure Medium Total										8.9E-07					0.005
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m <sup>3</sup>	3.5E-09	(mg/m³)	NA	(ug/m³) <sup>-1</sup>		2.5E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000005
				Chromium	1.4E-9	mg/m <sup>3</sup>	1.3E-11	(mg/m <sup>3</sup> )	8.4E-02	(ug/m <sup>9</sup> ) <sup>-1</sup>	1.1E-09	3.1E-11	(mg/m³)	1.0E-04	(mg/m³)	3.1E-7
			Exp. Route Total								1.1E-09					0.000005
		Exposure Point Total					1				1.1E-09					0.000005
	Exposure Medium Total						1				1.1E-09	1				0.000005
Medium Total											8.9E-07					0.005
							<del>!</del>	Total of	Receptor Risks	Across All Media	8.9E-07		Total of Rec	eptor Hazards	Across All Media	0.005

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.2.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	itions			Non-Ca	ncer Hazard C	alcutations	
		:	1	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/I	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rf	D/RfC	Hazard Quotien
				ì	1		Value	Units	Value	Units		Value	Units	Value	Units	<u> </u>
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12,300	mg/kg	6.6E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
	1	ļ		Chromium	15.8	mg/kg	8.5E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	4.2E-07	3.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0010
			Exp. Route Total								4.2E-07					0.003
	1		Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	-
	ŀ			Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
			Exp. Route Total		•											
	ı	Exposure Point Total		<del></del>							4.2E-07					0.003
	Exposure Medium Total										4.2E-07					0.003
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m³	7.0E-09	(mg/m³)	NA	(ug/m³)-1		2.5E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000005
				Chromium	1.4E-9	mg/m <sup>3</sup>	9.0E-12	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> )-1	7.6E-10	3.1E-11	(mg/m³)	1.0E-04	(mg/m³)	3.1E-7
			Exp. Houte Total	1							7.6E-10					0.000005
		Exposure Point Total									7.6E-10					0.000005
	Exposure Medium Total										7.6E-10					0.000005
Medium Total											4.2E-07					0.003
								Total of	Receptor Risks	Across All Media	4.2E-07		Total of Rece	ptor Hazards	Across All Media	0.003

<sup>1 -</sup> Multagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 7.3.RME

#### CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

#### REASONABLE MAXIMUM EXPOSURES

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	ncer Risk Calcula	ations .			Non-Ca	ncer Hazard Ci	alculations	
				Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfl	D/RfC	Hazard Quotient
				1			Value	Units	Value	Units	1	Value	Units	Value	Units	l
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12,300	mg/kg	4.3E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
		i	1	Chromium	15.8	mg/kg	5.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	2.8E-06	1.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
			Exp. Route Total								2.8E-06					0.02
			Dermai	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
			Exp. Route Total				l									
	<u> </u>	Exposure Point Total									2.8E-06					0.02
	Exposure Medium Total										2.8E-06					0.02
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m³	9.1E-08	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		2.6E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00005
	1			Chromium	1.4E-9	mg/m <sup>3</sup>	1.2E-10	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ):1	9.8E-09	3.3E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000003
			Exp. Route Total								9.8E-09					0.00005
		Exposure Point Total	·								9.8E-09					0.00005
	Exposure Medium Total										9.8E-09					0.00005
Medium Total											2.8E-06					0.02
								Total of	Receptor Risks	Across All Media	2.8E-06		Total of Rec	eptor Hazards	Across All Media	0.02

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 7.4.RME

#### CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

#### REASONABLE MAXIMUM EXPOSURES

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	ations			Non-Ca	ncer Hazard Ci	alculations	
				Potential Concern	Value	Units	Intake/Exposu	e Concentration	CSF/I	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rft	D/RfC	Hazard Quotien
		1			ł		Value	Units	Value	Units		Value	Units	Value	Units	1
Surface Soil	Surface Soil	PCB Removal Area	ingestion	Aluminum	12,300	mg/kg	4.6E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		3.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
			L	Chromium	15.8	mg/kg	1.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)-1	8.9E-07	4.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001
			Exp. Route Total						-		8.9E-07					0.005
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
			Exp. Route Total													
		Exposure Point Total		<del> </del>			i				8.9E-07					0.005
	Exposure Medium Total	<u> </u>									8.9E-07					0.005
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m³	3.5É-09	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		2.5E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000005
	ł			Chromium	1.4E-9	mg/m³	1.3E-11	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.1E-09	3.1E-11	(mg/m <sup>3</sup> )	1.0E-04	(mg/m <sup>3</sup> )	3.1E-7
	(		Exp. Route Total	1							1.1E-09					0.000005
	l l	Exposure Point Total									1.1E-09					0.000005
	Exposure Medium Total										1.1E-09					0.000005
Medium Total							*****				8.9E-07					0.005
								Total of	Receptor Risks	Across All Media	8.9E-07		Total of Rec	optor Hazards	Across All Media	0.005

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.5 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PĈ		Car	cer Risk Calcula	ations			Non-Ca	ncer Hazard Ca	alculations	
		·	1	Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Unit Risk	Cancer Risk	Intake/Exposu	re Concentration	RfC	D/RfC	Hazard Quotient
			l		ł		Value	Units	Value	Units		Value	Units	Value	Units	1
Surface Soll	Surface Soil	PCB Removal Area	ingestion	Aluminum	12,300	mg/kg	6.6E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		- 2.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
				Chromium	15.8	mg/kg	8.5E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	4.2E-07	3.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0010
			Exp. Route Total	1							4.2E-07					0.003
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	٠-
			Exp. Route Total		•									_		
		Exposure Point Total		*							4.2E-07					0.003
	Exposure Medium Total										4.2E-07					0.003
	Air	PCB Removal Area	Inhalation	Atuminum	1.1E-6	mg/m³	7.0E-09	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		2.5E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000005
			1	Chromium	1.4E-9	mg/m³	9.0E-12	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	7.6E-10	3.1E-11	(mg/m³)	1.0E-04	(mg/m <sup>3</sup> )	3.1E-7
	i		Exp. Route Total								7.6E-10					0.000005
		Exposure Point Total									7.6E-10					0.000005
	Exposure Medium Total										7.6E-10					0.000005
Medium Total											4.2E-07					0.003
				•				Total of	Receptor Risks	Across All Media	4.2E-07		Total of Rec	eptor Hazards A	Across All Media	0.003

Makes

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.6.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PČ		Car	cer Risk Calcula	ations			Non-Ca	ncer Hazard Ca	dculations	
		ľ		Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Unit Ĥisk	Cancer Risk	Intake/Exposu	re Concentration	RfD	D/RIC	Hazard Quotier
		İ					Value	Units	Value	Units	1	Value	Units	Value	Units	
urface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12,300	mg/kg	4.3E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
				Chromium	15.8	mg/kg	5.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	2.8E-06	1.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
		ļ	Exp. Route Total								2.8E-06			-		0.02
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day).1		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
			Exp. Route Total													
		Exposure Point Total	,								2.8E-06					0.02
	Exposure Medium Total										2.8E-06					0.02
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m <sup>3</sup>	9.1E-08	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		2.6E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00005
			1	Chromium	1.4E-9	mg/m <sup>3</sup>	1.2E-10	(mg/m <sup>3</sup> )	8.4E-02	(ug/m <sup>3</sup> )-1	9.8E-09	3.3E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000003
			Exp. Route Total								9.8E-09					0.00005
		Exposure Point Total									9.8E-09			***		0.00005
	Exposure Medium Total	<u></u>					ĺ			-	9.8E-09					0.00005
Medium Total	V					—					2.8E-06					0.02
								Total of	Receptor Risks	Across All Media	2.8E-06		Total of Rece	eptor Hazards A	Across All Media	0.02

Notor

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 7.7.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD. NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timetrame: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC		Car	cer Risk Calcula	itions			Non-Ca	ncer Hazard C		
				Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/I	Jnit Aisk	Cancer Risk	Intake/Exposu	re Concentration	· Ri	D/RfC	Hazard Quotie
							Value	Units	Value	Units	1	Value	Units	Value	Units	1
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12,300	mg/kg	3.0E-04	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		2.1E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
				Chromium	15.8	mg/kg	3.8E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	1.9E-07	2.7E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.001
			Exp. Route Total								1.9E-07					0.02
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	
		,	Exp. Route Total		•											
		Exposure Point Total		,			1				1.9E-07					0.02
	Exposure Medium Total										1.9E-07					0.02
	Air	PCB Removal Area	Inhalation	Aluminum	0.009	mg/m³	1.5E-05	(mg/m³)	NA	(ug/m³)⁻¹		1.0E-03	(mg/m³)	5.0E-03	(mg/m³)	0.2
				Chromium	1.1E-5	mg/m³	1.9E-08	(mg/m³)	8.4E-02	(ug/m³) <sup>-1</sup>	1.6E-06	1.3E-06	(mg/m <sup>3</sup> )	1.0E-04	(mg/m³)	0.01
			Exp. Route Total								1.6E-06	}				0.2
	i i	Exposure Point Total	,								1.6E-06					0.2
	Exposure Medium Total						i i		·		1.6E-06					0.2
Medium Total											1.8E-06					0.2
	•								Receptor Risks	Across All Media	1.8E-06		Total of Rece	eptor Hazards	Across All Media	0.2

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

### TABLE 7.8 RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	Į.	Car	cer Risk Calcula	ations		Non-Cancer Hazard Calculations				
			i	Potential Concern	Value	ue Units	Intake/Exposure Concentration CSF/Unit Risk		Jnit Risk	Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotier	
					1	ļ	Value	Units	Value	Units	1	Value	Units	Value	Units	1
Surface Soil	Surface Soil	PCB Removal Area	Point Total   Properties   Pr	0.2												
			1 .	Chromium	15.8	mg/kg	9.2E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	4.6E-05	2.0E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.07
			Exp. Route Total								4.6E-05				Units (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day) (mg/kg/day)	0.2
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NΑ	(mg/kg/day)		0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
			-	Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) <sup>-1</sup>		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
			Exp. Route Total	)												
		Exposure Point Total									4.6E-05					0.2
	Exposure Medium Total										4.6E-05					0.2
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m <sup>3</sup>	9.2E-08	(mg/m³)	NA	(ug/m <sup>3</sup> )-1		1.1E-06	(mg/m³)	5.0E-03	(mg/m <sup>3</sup> )	0.0002
				Chromium	1.4E-9	mg/m³	6.3E-10	(mg/m³)	8.4E-02	(ug/m³)-1	5.3E-08	1.4E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00001
			Exp. Route Total								5.3E-08					0.0002
		Exposure Point Total									5.3E-08					0.0002
	Exposure Medium Total										5.3E-08					0.0002
Medium Total			Exp. Route Total		0.2											
·							•	Total of	Receptor Risks	Across All Media	4.6E-05		Total of Rec	otor Hazards A	Across All Media	0.2

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 7.9.RME CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of	E	PC	l	Car	ncer Risk Calcula	ations			Non-Ca	ncer Hazard C	e Units  00 (mg/kg/day) 03 (mg/kg/day)  00 (mg/kg/day)  05 (mg/kg/day)  05 (mg/kg/day)	
	1			Potential Concern	Value	Units	Intake/Exposu	re Concentration	CSF/	Jnit Risk	Cancer Risk	Intake/Exposu	re Concentration	Rfi	D/RfC	Hazard Quotient
	1						Value	Units	Value	Units		Value	Units	Value	Units	1
surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12,300	mg/kg	5.8E-03	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>		1.7E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
				Chromium	15.8	mg/kg	1.4E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) <sup>-1</sup>	6.8E-06	2.2E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.007
			Exp. Route Total								6.8E-06	]			RID/RIC	0.02
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) <sup>-1</sup>	~ -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	
	<b>-</b>		I	Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day)		0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	
ų.			Exp. Route Total													
		Exposure Point Total					1				6.8E-06					0.02
	Exposure Medium Total										6.8E-06					0.02
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m <sup>3</sup>	3.7E-07	(mg/m³)	NA	(ug/m <sup>3</sup> ) <sup>-1</sup>		1.1E-06	(mg/m <sup>3</sup> )	5.0E-03	(mg/m³)	0.0002
				Chromium	1.4E-9	mg/m <sup>3</sup>	8.7E-10	(mg/m³)	8.4E-02	(ug/m <sup>3</sup> ) <sup>-1</sup>	7.3E-08	1.4E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00001
1			Exp. Route Total								7.3E-08	1				0.0002
		Exposure Point Total									7.3E-08					0.0002
	Exposure Medium Total										7.3E-08					0.0002
Medium Total											6.9E-06					0.02
								Total o	Receptor Risks	Across All Media	6.9E-06	î — — —	Total of Rec	eptor Hazards	Across All Media	0.02

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# RAGS Part D Table 9 Summary of Receptor Risks and Hazards for COPCs



#### LIST OF TABLES RAGS PART D TABLE 9 - NORTH WATERFRONT SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS

#### Table No. Reasonable Maximum Exposures 9.1.RME Current Adolescent Trespassers - North Waterfront Current Adult Trespassers - North Waterfront 9.2.RME 9.3.RME Current Lifelong Trespassers - North Waterfront 9.4.RME Current Industrial Workers - North Waterfront Future Adolescent Trespassers - North Waterfront 9.5.RME 9.6.RME Future Adult Trespassers - North Waterfront Future Lifelong Trespassers - North Waterfront 9.7.RME Future Industrial Workers - North Waterfront 9.8.RME 9.9.RME Current/Future Construction Workers - North Waterfront Hypothetical Child Residents - North Waterfront 9.10.RME 9.11.RME Hypothetical Adult Residents - North Waterfront 9.12.RME Hypothetical Lifelong Residents - North Waterfront

#### TABLE 9.1.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential	1		Carcinogeni	Risk			Non-Carcin	ogenic Hazard	Quotient	
		. •	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Aluminum				1		CNS	0.002	1		0.002
		1	Arsenic	3E-07		2E-07		6E-07	Skin, CVS	0.005	1 1	0.004	0.009
	1	1	Manganese				1 1		CNS	0.003			0.003
		1	Chemical Total	3E-07		2E-07		6E-07		0.010		0.004	0.01
		Exposure Point Total					· i	6E-07		0.010			0.01
	Exposure	Medium Total					ì	6E-07					0.00
	Air	North Waterfront	Aluminum				1		CNS		0.000003		0.000003
		1	Arsenic		8E-12			8E-12	Skin, CVS		0.0000008		0.0000008
		i	Manganese				1 L		CNS		0.000009		0.000009
		1	Chemical Total		8E-12		[	8E-12	į		0.00001	Dermal 0.004 0.004	0.00001
		Exposure Point Total			•	•		8E-12					0.00001
	Exposure	Medium Total		<u> </u>			i i	8E-12					0.00001
Medium Total				7				6E-07					0.01
Receptor Total						Doco	ptor Risk Total	6É-07	<u> </u>	CNS     0.000008			

Notes:

1 - Mulagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.2.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern			Carcinogenio	Risk		Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	North Waterfront	Aluminum			05.00			CNS	0.001			0.001	
			Arsenic Manganese	5E-07		6E-08	-	6E-07	Skin, CVS CNS	0.004 0.002		0.0005	0.004 0.002	
li .	1		Chemical Total	5E-07		6E-08	i 1	6E-07	j	0.007		0.0005	0.007	
•	1	Exposure Point Total			•			6E-07					0.007	
1	Exposure N	Medium Total						6E-07					0.007	
i	Air	North Waterfront	Aluminum						CNS		0.000003		0.000003	
			Arsenic		2E-11			2E-11	Skin, CVS		0.0000008		0.0000008	
			Manganese						CNS		0.000009		0.000009	
		į	Chemical Total	]	2E-11			2E-11			0.00001		0.00001	
		Exposure Point Total						2E-11					0.00001	
	Exposure N	Medium Total						2E-11					0.00001	
Medium Total								6E-07					, 0.007	
Receptor Total				•		Rece	otor Risk Total	6E-07			Rece	eptor HI Total	0.007	
Notes:														

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.3.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk		Non-Carcinogenic Hazard Quotient					
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	North Waterfront	Aluminum											
1			Arsenic	8E-07		3E-07	į l	1E-06						
1			Manganese						}					
1	ļ		Chemical Total	8E-07		3E-07	[	1E-06						
	1	Exposure Point Total		1				1E-06						
	Exposure	Medium Total						1E-06				Demal		
	Air	North Waterfront	Aluminum											
			Arsenic		2E-11			2E-11			i		1	
		ļ	Manganese				l 1							
i		i	Chemical Total		2E-11			2E-11						
l l		Exposure Point Total		<u> </u>				2E-11						
I	Exposure	Medium Total						2E-11						
Medium Total								1E-06						
Receptor Total				1		Rece	otor Risk Total	1E-06					i	
Note:		· · · · · · · · · · · · · · · · · · ·	· · ·						•					

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.4.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current

Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk	-	Non-Carcinogenic Hazard Quotient					
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Demal	Exposure Routes Total	
Surface Soil	Surface Soil	North Waterfront	Aluminum Arsenic Manganese	3E-06		6E-07		4E-06	CNS Skin, CVS CNS	0.007 0.02 0.009	  	0.004	0.007 0.02 0.009	
		Exposure Point Total	Chemical Total	3E-06		6E-07		4E-06 4E-06		0.04	**	0.004	0.04	
<b>J</b>	Exposure N	fedium Total		1				4E-06					0.04	
	Air	North Waterfront	Aluminum Arsenic Manganese		2E-10	  	  	2E-10	CNS Skin, CVS CNS	**	0.00003 0.000009 0.00010		0.00003 0.000009 0.00010	
	Ì	Exposure Point Total	Chemica! Total		2E-10		I	2E-10 2E-10			0.0001		0.0001	
		fedium Total						2E-10					0.0001	
Medium Total								4E-06					0.04	
Receptor Total			<u> </u>	·		Recep	otor Risk Total	4E-06			Rece	0.04		
Notes:	·					<u> </u>								

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent PAGE 1 OF 1

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	: Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Aluminum Arsenic	3E-07		2E-07		5E-07	CNS Skin, CVS	0.002 0.005		0.003	0.002 0.008
			Manganese Chemical Total	3E-07		2E-07		5E-07	CNS	0.003		0.003	0.003
		Exposure Point Total			•			5E-07					0.01
i	Exposur	re Medium Total						5E-07					0.01
	Air	North Waterfront	Aluminum Arsenic		7E-12			7E-12	CNS Skin, CVS CNS		0.000003 0.0000008 0.00001		0.000003 0.0000008 0.00001
1			Manganese Chemical Total	<del>-</del>	7E-12		<del>                                     </del>	7E-12	CNS		0.00001		0.00001
		Exposure Point Total		╣		<del></del>		7E-12					0.00001
	Exposul	re Medium Total						7E-12					0.00001
Medium Total	'							5E-07					0.01
Subsurface Soil	Subsurface Soil	North Waterfront	Arsenic Manganese	4E-07		3E-07		7E-07	Skin, CVS CNS	0.006 0.003		0.004	0.01 0.003
1			Chemical Total	4E-07		3E-07		7E-07	ļ	0.009	لــــ <del>ــتـــــ</del> ـــــــــــــــــــــــــ	0.004	0.01
1		Exposure Point Total		<del></del>				7E-07					0.01
	Exposul	re Medium Total  North Waterfront	Arsenic	<u></u>	9E-12		<del></del>	9E-12	Skin, CVS	1	0.0000009		0.0000009
	All	North Waterhold	Manganese				] [	9E-12	CNS		0.000010		0.000010
1			Chemical Total		9E-12			9E-12	]		0.00001		0.00001
ļ		Exposure Point Total		][				9E-12					0.00001
	Exposul	re Medium Total						9E-12				·	0.00001
Medium Total								7E-07					0.01
Receptor Total Notes:				_		Rece	otor Risk Total	1E-06	L		Rece	eptor HI Total	0.03

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Aluminum						CNS	0.001			0.001
	İ		Arsenic	5E-07		6E-08		5E-07	Skin, CVS	0.004		0.0004	0.004
	İ		Manganese						CNS	0.002			0.002
	i		Chemical Total	5E-07		6E-08		5E-07	]	0.007		0.0004	0.007
	1	Exposure Point Total						5E-07					0.007
ŀ	Exposur	e Medium Total			•			5E-07					0.007
	Air	North Waterfront	Aluminum Arsenic		1E-11			1E-11	CNS Skin, CVS		0.000003		0.000003 0.0000008
	1		Manganese						CNS		0.00001		0.00001
			Chemical Total		1E-11			1E-11	i		0.00001		0.00001
		Exposure Point Total	,	<del>-</del>				1E-11	1	<del>'</del>			0.00001
	Exposur	e Medium Total		1				1E-11					0.00001
Medium Total		S Wilder Control						5E-07		•			0.007
Subsurface Soil	Subsurface Soil	North Waterfront	IArsenic	6E-07		7É-08		6E-07	Skin, CVS	0.004		0.0005	0.005
	l	į.	Manganese						CNS	0.002			0.002
1.	1	i	Chemical Total	6E-07		7E-08		6E-07	]	0.006		0.0005	0.007
	i	Exposure Point Total						6E-07					0.007
	Exposur	e Medium Total						6E-07					0.007
	Air	North Waterfront	Arsenic		2E-11			2E-11	Skin, CVS		0.0000009		0.0000009
	1	1	Manganese		}		- ]		CNS		0.000010		0.000010
	ł	1	Chemical Total		2E-11			2E-11	]		0.00001		0.00001
	i i	Exposure Point Total		7			•	2E-11	1	-			0.00001
	Exposur	e Medium Total		Ti Ti				2E-11					0.00001
Medium Total			<del></del>					6E-07	1				0.007
Receptor Total						Rece	ptor Risk Total	1E-06	<u> </u>		Rece	eptor HI Total	

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.7.FME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Aluminum Arsenic Manganese	8E-07		3E-07		1E-06					
			Chemical Total	8E-07		3E-07	- 1	1E-06	j				
		Exposure Point Total	•	Ī				1E-06	l				
	Exposure	e Medium Total		]				1E-06					
	Air	North Waterfront	Aluminum Arsenic		2E-11			2E-11					
ľ		İ	Manganese	<u> </u>			<u> </u>		1	ļ			<u></u>
<b>[</b>			Chemical Total	<u> </u>	2E-11			2E-11	ļ	l	اـــــــــــــــــــــــــــــــــــــ		ļ
1		Exposure Point Total		<u> </u>				2E-11	<u></u>				
	Exposure	e Medium Total		<del> </del>				2E-11			<del></del>		
Medium Total	ISubsurface Soil	North Waterfront	Arsenic	1E-06		3E-07	<del></del>	1E-06 1E-06			T		
Subsurface Soil	Subsurface Soil	North Waterront	Manganese										
			Chemical Total	1E-06_	<u></u>	3E-07		1E-06		<u> </u>			
		Exposure Point Total		<u> </u>				1E-06					
ll .	Exposure	e Medium Total						1E-06					
	Air	North Waterfront	Arsenic Manganese		3E-11			3E-11					
	1		Chemical Total		3E-11			3E-11	]				
	<u> </u>	Exposure Point Total						3E-11					
	Exposure	e Medium Total						3E-11					
Medium Total								1E-06					
Receptor Total						Rece	ptor Risk Total	2E-06					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	: Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Aluminum						CNS	0.006			0.006
		1	Arsenic	3E-06		6E-07		4E-06	Skin, CVS	0.02		0.004	0.02
	į.	i	Manganese						CNS	0.01			0.01
			Chemical Total	3E-06		6E-07		4E-06	]	0.04		0.004	0.04
1		Exposure Point Total						4E-06					0.04
.)	Exposure	e Medium Total				•		4E-06					0.04
	Air	North Waterfront	Aluminum						CNS		0.00003		0.00003
			Arsenic		2E-10			2E-10	Skin, CVS		0.000008		0.000008
]			Manganese	i					CNS		0.0001		0.0001
		L	Chemical Total	<u> </u>	2E-10			2E-10			0.0001		0.0001
		Exposure Point Total						2E-10					0.0001
	Exposure	e Medium Total						2E-10					0.0001
Medium Total								4E-06					0.04
Subsurface Soil	Subsurface Soil	North Waterfront	Arsenic	4E-06		7E-07	-	4E-06	Skin, CVS	0.02		0.005	0.03
			Manganese				1 ]		CNS	0.01			0.01
			Chemical Total	4E-06		7E-07		4E-06	]	0.03		0.005	0.04
ſ		Exposure Point Total						4E-06					0.04
i	Exposure	e Medium Total		1				4E-06					0.04
•	Air	North Waterfront	Arsenic		2E-10		T	2E-10	Skin, CVS		0.000010		0.000010
			Manganese						CNS		0.0001		0.0001
			Chemical Total		2E-10			2E-10	1		0.0001		0.0001
		Exposure Point Total		<b>-</b>			•	2E-10					0.0001
	Exposure	e Medium Total		1				2E-10					0.0001
Medium Total	LABOUR.	7.14		<del> </del>				4E-06					0.04
Recentor Total						Rece	ptor Risk Total				Rec	eptor HI Total	0.08

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Construction Workers

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Aluminum Arsenic	2E-07		2E-08		2E-07	CNS Skin, CVS	0.01 0.03		0.003	0.01 0.04
			Manganese Chemical Total	2E-07		2E-08		2E-07	CNS	0.02		0.003	0.02
		Exposure Point Total						2E-07					0.06
	Exposure I	Medium Total						2E-07	<u></u>				0.06
	Air	North Waterfront	Aluminum		3E-08			3E-08	CNS Skin, CVS		0.1 0.03		0.1 0.03
			Arsenic Manganese		3E-08			3E-06	CNS		0.03		0.03
li			Chemical Total	<u> </u>	3E-08			3E-08			0.6		0.6
ii .		Exposure Point Total						3E-08					0.6

4E-08

4E-08

3E-07

2E-08

2E-08

Receptor Risk Total

3E-08

3E-07

3E-07

3E-07 3E-07 4E-08

4E-08 4E-08

4E-08

3Ē-07

6E-07

Skin, CVS

CNS

Skin, CVS

CNS

0.02

0.06

0.04

0.4

0.5

Medium Total Receptor Total

Medium Total Subsurface Soil

Exposure Point Total

North Waterfront

North Waterfront

Arsenic

Manganese

Manganese

Chemical Total

Chemical Total

Exposure Medium Total

Exposure Medium Total

Exposure Point Total
Exposure Medium Total

Subsurface Soil

0.6

0.6

0.04

0.02

0.06

0.06

0.04

0.4

0.5

0.5

0.5

0.5

0.004

Receptor HI Total

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.10.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcin	ogenic Hazard		
			Concern	Ingestion	Inhalation	Dermal	External	Exposure	Primary	Ingestion	Inhalation	Dermal	Expos
							(Radiation)	Routes Total	Target Organ(s)				Routes
Soil	Surface Soil	North Waterfront	Aluminum						CNS	0.08			0.0
			Arsenic	9E-06		8E-07		1E-05	Skin, CVS	0.2		0.02	0.3
			Manganese						CNS	0.1			0.1
			Chemical Total	9E-06		8E-07		1E-05		0.5		0.02	0.5
	ı	Francisco Delet Tetal						1E 05					- O E

	) Mealum	Point	of Potential	II .									
			Concern	Ingestion	Inhalation	Dermal	External	Exposure	Primary	Ingestion	Inhalation	Dermal	Exposure
				<u> </u>			(Radiation)	Routes Total	Target Organ(s)				Routes Tota
urface Soil	Surface Soil	North Waterfront	Aluminum	1			**		CNS	0.08			0.08
			Arsenic	9E-06		8E-07		1E-05	Skin, CVS	0.2		0.02	0.3
			Manganese						CNS	0.1			0.1
			Chemical Total	9E-06		8E-07		1E-05		0.5		0.02	0.5
		Exposure Point Total					[	1E-05					0.5
	Exposur	e Medium Total						1E-05					0.5
	Air	North Waterfront	Aluminum	1			1		CNS		0.0001		0.0001
			Arsenic	ll	2E-10		I [	2E-10	Skin, CVS	i	0.00003		0.00003
			Manganese						CNS		0.0004		0.0004
			Chemical Total	]	2E-10		1	2E-10			0.0006		0.0006
		Exposure Point Total		]				2E-10					0.0006
	Exposur	e Medium Total		1				2E-10					0.0006
edium Total	•							1E-05					0.5
bsurface Soil	Subsurface Soil	North Waterfront	Arsenic	1E-05		1E-06	1	1E-05	Skin, CVS	0.3		0.03	0.3
			Manganese	ال			l L		CNS	0.1			0.1
			Chemical Total	1E-05		1E-06	[	1E-05		0.4		0.03	0.5
		Exposure Point Total	•			-		1E-05					0.5
	Exposul	re Medium Total						1E-05					0.5
	Air	North Waterfront	Arsenic	T	2E-10			2E-10	Skin, CVS		0.00004	+-	0.00004
			Manganese				l 1		CNS		0.0004		0.0004
			Chemical Total		2E-10		[	2E-10	Ì		0.0005		0.0005
		Exposure Point Total						2E-10					0.0005
	Exposu	e Medium Total						2E-10		``			0.0005
edium Total	<del></del>			1				1E-05			·		0.5
ceptor Total				-		Dage	tor Risk Total	2E-05			Dee	eptor HI Total	0.9

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.11.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

PAGE 1 OF 1

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	ic Risk			Non-Carcir	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Aluminum		<del></del>				CNS	0.009			0.009
	i		Arsenic	4E-06		5E-07	}	5E-06	Skin, CVS	0.03		0.003	0.03
			Manganese						CNS	0.01			0.01
	ĺ		Chemical Total	4E-06		5E-07		5E-06	]	0.05		0.003	0.05
	<u>i</u>	Exposure Point Total						5E-06					0.05
	Exposu	re Medium Total						5E-06					0.05
	Air	North Waterfront	Aluminum						CNS		0.0001		0.0001
			Arsenic		7E-10			7E-10	Skin, CVS		0.00003		0.00003
			Manganese				]		CNS		0.0004		0.0004
			Chemical Total		7E-10		**	7E-10	]		0.0006		0.0006
		Exposure Point Total						7E-10	1				0.0006
	Exposu	re Medium Total						7E-10		· · · · · · · · · · · · · · · · · · ·			0.0006
Medium Total								5E-06					0.05
Subsurface Soil	ISubsurface Soil	North Waterfront	Arsenic	5E-06		6E-07		6E-06	Skin, CVS	0.03		0.004	0.04
	İ		Manganese						CNS	0.01			0.01
		i	Chemical Total	5E-06		6E-07		6E-06	1	0.05		0.004	0.05
	1	Exposure Point Total			1	· · · · · · · · · · · · · · · · · · ·	-	6E-06	<b>-</b>				0.05
	Exposu	re Medium Total						6E-06					0.05
	Air	I North Waterfront	Arsenic		9E-10		T	9E-10	Skin, CVS		0.00004		0.00004
	[	l	Manganese				) I		CNS		0.0004		0.0004
		ĺ	Chemical Total	=	9E-10			9E-10	1	-+	0.0005		0.0005
		Exposure Point Total	70	┪			•	9E-10	1				0.0005
	Exposu	re Medium Total		<del>-</del>				9E-10	1				0.0005
Medium Total	EADOOG	TO MODIFIE FOLD						6E-06	1				0.05
Receptor Total						Pace	ptor Risk Total		<del>†                                      </del>		Rece	eptor HI Total	0.1
Notae:			···			TICCC	ptor ruok rotar	12.00			1100	opto rotal	• •

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.12.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

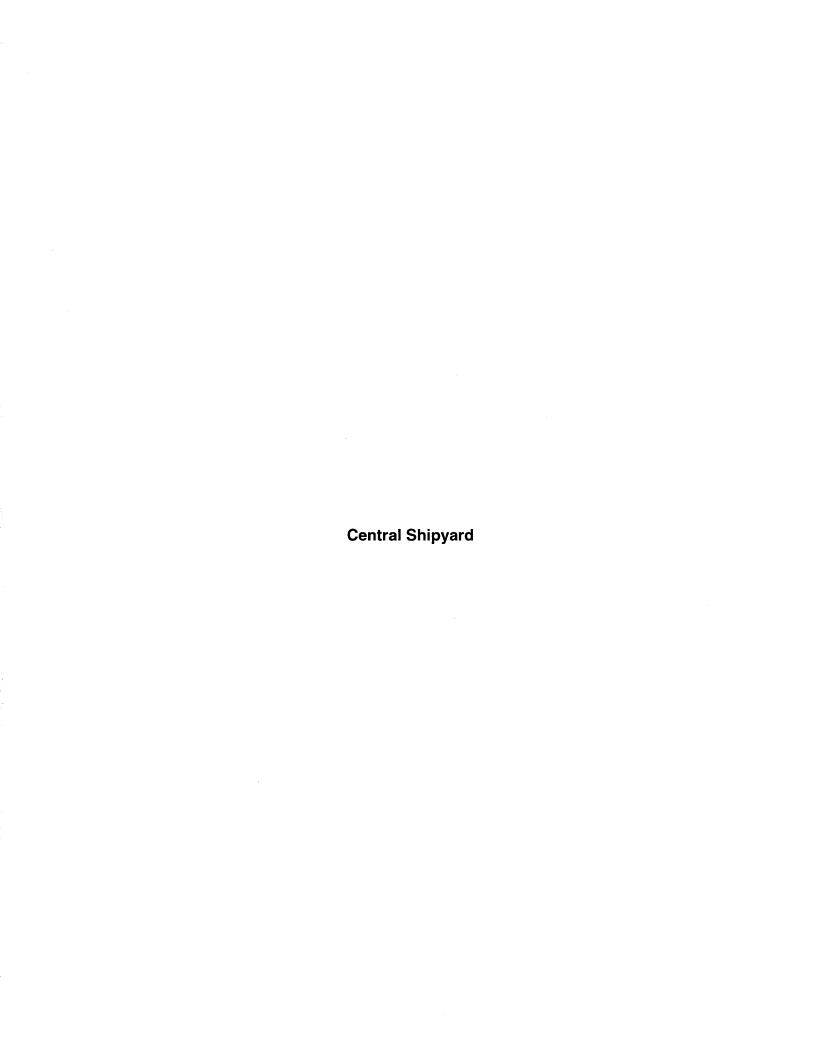
PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Aluminum Arsenic Manganese	1E-05		1E-06		1E-05					
			Chemical Total	1E-05		1E-06	i	1E-05	j				
1		Exposure Point Total		1				1E-05					
	Exposure	Medium Total						1E-05					L
	Air	North Waterfront	Aluminum Arsenic		9E-10			9E-10					
		1	Manganese				<u></u>		1		<b>.</b>		
ļļ.			Chemical Total		9E-10		<u> </u>	9E-10		]			
i		Exposure Point Total						9E-10					
	l Exposure	Medium Total		1				9Ē-10					
Medium Total	10.1 4 0	T North Miles design	The second secon	05.05		05.00	<del> </del>	1E-05	ļ	·····	·		
Subsurface Soil	Subsurface Soil	North Waterfront	Arsenic Manganese	2E-05		2E-06		2E-05	]				
1			Chemical Total	2E-05		2E-06		2E-05	]				
	1	Exposure Point Total						2E-05					
	Exposure	Medium Total		J				2E-05					
ŀ	Air	North Waterfront	Arsenic Manganese		1E-09			1E-09					
		i	Chemical Total	<del></del>	1E-09		<del> (</del>	1E-09	1				
1		Exposure Point Total		1			·	1E-09	1	•			
1	Exposure	Medium Total						1E-09					
Medium Total				II				2E-05					
Receptor Total						Rece	tor Risk Total	3E-05					
Notes:				· ·				•					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



#### LIST OF TABLES RAGS PART D TABLE 9 - CENTRAL SHIPYARD SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS

# Table No. Reasonable Maximum Exposures 9.1.RME 9.2.RME 9.3.RME 9.4.RME 9.5.RME 9.5.RME 9.6.RME 9.7.RME 9.7.RME 9.8.RME 9.8.RME 9.8.RME 9.8.RME 9.8.RME 9.9.RME 9.9.RME 9.9.RME 9.9.RME 9.9.RME 9.9.RME

# TABLE 9.1.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Tirneframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie				Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum	3			- 1		CNS	0.003			0.003
			Chemical Total							0.003			0.003
		Exposure Point Total	•					**					0.003
	Exposure	Medium Total											0.003
li .	Air	Central Shipyard	Aluminum						CNS		0.000005		0.000005
l l			Chemical Total				]		l.		0.000005		0.000005
		Exposure Point Total	<del></del>										0.000005
	Exposure	Medium Total											0.000005
Medium Total													0.003
Receptor Total						Rece	otor Risk Total				Rec	eptor HI Total	0.003

otes:

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.2.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum				I I		CNS	0.002			0.002
			Chemical Total							0.002			0.002
		Exposure Point Total											0.002
	Exposure N	ledium Total											0.002
	Air	Central Shipyard	Aluminum	j <del>i</del>			1		CNS		0.000005		0.000005
	1		Chemical Total	]					Ì		0.000005		0.000005
li .		Exposure Point Total		1									0.000005
,	Exposure N	fedium Total		1									0.000005
Medium Total	·			3								•	0.002
Receptor Total		· · · · · · · · · · · · · · · · · · ·	·	<del> </del>		Rece	otor Risk Total				Rece	eptor HI Total	0.002

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.3.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	c Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum						CNS	0.01			0.01
		· ·	Chemical Total							0.01			0.01
		Exposure Point Total		1									0.01
	Exposure	Medium Total		1					lf				0.01
	Air	Central Shipyard	Aluminum						CNS		0.00005		0.00005
			Chemical Total	T					1		0.00005		0.00005
		Exposure Point Total	·										0.00005
	Exposure	Medium Total		1									0.00005
Medium Total				T					l				0.01
Receptor Total		<del></del>				Rece	ptor Risk Total				Rec	eptor HI Total	0.01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.4.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	: Risk		ì	Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum						CNS	0.003			0.003
	1		Chemical Total							0.003			0.003
	i	Exposure Point Total			-								0.003
	Exposure	e Medium Total											0.003
	Air	Central Shipyard	Aluminum	3					CNS		0.000005		0.000005
			Chemical Total			*			l		0.000005		0.000005
		Exposure Point Total											0.000005
	Exposure	e Medium Total											0.000005
Medium Total													0.003
Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese				]		CNS	0.004			0.004
1			Chemical Total							0.004			0.004
		Exposure Point Total											0.004
	Exposure	e Medium Total								•			0.004
	Air	Central Shipyard	Manganese				] I		CNS		0.00002		0.00002
			Chemical Total						]		0.00002		0.00002
		Exposure Point Total											0.00002
	Exposur	e Medium Total											0.00002
Medium Total													0.004
Receptor Total	-				·	Rece	ptor Risk Total				Rece	eptor HI Total	0.008

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation		Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum						CNS	0.002	1		0.002
			Chemical Total		'				l	0.002			0.002
		Exposure Point Total	•										0.002
	Exposu	e Medium Total											0.002
	Air	Central Shipyard	Aluminum						ĊNŠ		0.000005		0.000005
			Chemical Total								0.000005		0.000005
		Exposure Point Total											0.000005
· ·	Exposu	e Medium Total									•		0.000005
Medium Total													0.002
Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese						CNS	0.003	=		0.003
			Chemical Total							0.003		1	0.003
	<u> </u>	Exposure Point Total											0.003
	Exposu	e Medium Total											0.003
	Air	Central Shipyard	Manganese						CNS		0.00002	-	0.00002
			Chemical Total				I				0.00002	1	0.00002
		Exposure Point Total											0.00002
	Exposu	e Medium Total											0.00002
Medium Total													0.003
Receptor Total						Rece	ptor Risk Total				Rece	eptor HI Total	0.005

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation		Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum	<u> </u>			- 1		ÇNS	0.01	1		0.01
	1	1	Chemical Total						1	0.01			0.01
	1	Exposure Point Total			•		`						0.01
	Exposur	e Medium Total							· ·				0.01
	Air	Central Shipyard	Aluminum						CNS		0.00005		0.00005
			Chemical Total						}		0.00005		0.00005
	<u> </u>	Exposure Point Total	·	3									0.00005
	Exposur	e Medium Total											0.00005
Medium Total		<del> </del>	· · · · · · · · · · · · · · · · · · ·										0.01
Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese						CNS	0.02			0.02
		1	Chemical Total					* *	]	0.02			0.02
		Exposure Point Total		]									0.02
	Exposur	e Medium Total											0.02
	Air	Central Shipyard	Manganese				1		CNS	`	0.0002		0.0002
	ŀ		Chemical Total			-			]		0.0002		0.0002
	L	Exposure Point Total											0.0002
	Exposur	e Medium Total											0.0002
Medium Total			· · · · · · · · · · · · · · · · · · ·										0.02
Receptor Total						Rece	otor Risk Total				Rece	eptor HI Total	0.03

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

#### TABLE 9.7.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum				1		CNS	0.02			0.02
	]		Chemical Total							0.02			0.02
	1	Exposure Point Total											0.02
	Exposui	e Medium Total											0.02
	Air	Central Shipyard	Aluminum						CNS		0.2		0.2
			Chemical Total								0.2		0.2
		Exposure Point Total											0.2
	Exposu	e Medium Total											0.2
Medium Total													0.2
Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese						CNS	0.03			0.03
	ı		Chemical Total					**		0.03			0.03
	<u> </u>	Exposure Point Total											0.03
	Exposu	e Medium Total											0.03
	Air	Central Shipyard	Manganese				T. = . =		CNS		0.6		0.6
			Chemical Total			*-					0.6		0.6
		Exposure Point Total											0.6
	Exposu	e Medium Total											0.6
Medium Total				]									0.7
Receptor Total			•			Rece	otor Risk Total				Rec	eptor HI Total	0.9

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age; Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum	]			1		CNS	0.2	**		0.2
			Chemical Total						]	0.2		-	0.2
		Exposure Point Total	•										0.2
	Exposure	Medium Total											0.2
	Air	Central Shipyard	Aluminum				i		CNS		0.0002		0.0002
	i i	1	Chemical Total						1		0.0002		0.0002
	· ·	Exposure Point Total		j									0.0002
	Exposure	Medium Total		i						·			0.0002
Medium Total				Í									0.2
Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese				- 1		CNS	0.2			0,2
		1	Chemical Total					25	1	0.2			0.2
	1	Exposure Point Total											0.2
	Exposure	Medium Total											0.2
	Air	Central Shipyard	Manganese						CNS		0.0007		0.0007
	i	1 "	Chemical Total								0.0007		0.0007
		Exposure Point Total		1			•	7.5					0.0007
	Exposure	Medium Total	<del></del>										0.0007
Medium Total				<u> </u>									0.2
				<del></del>	-	Rece	otor Risk Total				Rec	eptor HI Total	0.4
Receptor Total						Rece	otor Risk Total		Ī		Rec	eptor HI Total	

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk			Non-Carcir	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation		Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum						CNS	0.02			0.02
			Chemical Total						]	0.02			0.02
		Exposure Point Total		]									0.02
	Exposu	re Medium Total											0.02
	Air	Central Shipyard	Aluminum				T 1		CNS		0.0002		0.0002
			Chemical Total						]		0.0002		0.0002
		Exposure Point Total											0.0002
	Exposu	re Medium Total		1									0.0002
Medium Total													0.02
Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese					*	ĆNŠ	0.02			0.02
•			Chemical Total						]	0.02			0.02
•		Exposure Point Total											0.02
1	Exposu	re Medium Total											0.02
	Air	Central Shipyard	Manganese				1		CNS		0.0007		0.0007
İ			Chemical Total						}		0.0007		0.0007
	ŀ	Exposure Point Total							Ì				0.0007
	Exposu	re Medium Total											0.0007
Medium Total													0.02
Receptor Total		-				Rece	ptor Risk Total				Rece	eptor HI Total	0.04
Notes:													

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.10.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Álumínum				]	* *					
			Chemical Total				-						
i		Exposure Point Total		J									
	Exposu	re Medium Total											
	Air	Central Shipyard	Aluminum			*-	]						
	l l		Chemical Total										
		Exposure Point Total  Exposure Medium Total  Central Shipyard  Aluminum  Chemical Total  Exposure Point Total  Exposure Medium Total											<u> </u>
	Exposu	re Medium Total											
Medium Total		•											
Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese						)				
	1		Chemical Total										
	1	Exposure Point Total							]				
	Exposu	re Medium Total											
	Air	Central Shipyard	Manganese						]				
			Chemical Total	3					]				
		Exposure Point Total											
	Exposu	re Medium Total											
Medium Total													
Receptor Total						Rece	ptor Risk Total						

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Former Building 234

#### LIST OF TABLES RAGS PART D TABLE 9 - FORMER BUILDING 234 SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

# Table No. Reasonable Maximum Exposures 9.1.RME 9.2.RME 9.3.RME 9.4.RME 9.5.RME 9.5.RME 9.5.RME 9.6.RME 9.6.RME 9.7.RME 9.7.RME 9.8.RME 9.8.RME 9.8.RME 9.8.RME 9.9.RME 9.9.RME 9.9.RME 9.9.RME 9.9.RME Puture Adolescent Trespassers - Former Building 234 9.7.RME Puture Adult Trespassers - Former Building 234 9.7.RME Puture Industrial Workers - Former Building 234 9.7.RME Puture Industrial Workers - Former Building 234 9.7.RME Puture Industrial Workers - Former Building 234 9.7.RME Puture Industrial Workers - Former Building 234 Puture Industrial Residents - Former Building 234 Puture Industrial Residents - Former Building 234 Puture Industrial Residents - Former Building 234 Puture Industrial Residents - Former Building 234

# TABLE 9.1.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum				[		CNS	0.003			0.003
	1		Chemical Total							0.003			0.003
		Exposure Point Total		1									0.003
	Exposure M	Medium Total											0.003
1	Air	Former Building 234	Aluminum				- I		CNS		0.000004		0.000004
		-	Chemical Total	3			[				0.000004		0.000004
		Exposure Point Total											0.000004
	Exposure N	Medium Total		1									0.000004
Medium Total	·												0.003
Receptor Total					•	Rece	tor Risk Total				Rece	eptor HI Total	0.003

Notes

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.2.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	: Risk			Non-Carcin	ogenic Hazard	Quotient	
_			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum						CNS	0.002			0.002
			Chemical Total							0.002			0.002
		Exposure Point Total										Dermal	0.002
1	Exposure M	Medium Total											0.002
	Air	Former Building 234	Aluminum					**	CNS		0.000004		0.000004
		1	Chemical Total				1				0.000004		0.000004
		Exposure Point Total	·	i									0.000004
	Exposure M	Medium Total	•		•					•			0.000004
Medium Total			•										0.002
Receptor Total						Rece	otor Risk Total				Reci	eptor HI Total	0.002

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.3.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	c Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum		**		I I		CNS	0.010			0.010
1			Chemical Total				1		<u>L</u>	0.010			0.010
]		Exposure Point Total		1									0.010
	Exposure M	ledium Total		I							,		0.010
1	Air	Former Building 234	Aluminum	<u></u>			- 1		CNS		0.00004		0.00004
i		,	Chemical Total					· ·			0.00004		0.00004
1		Exposure Point Total	•										0.00004
	Exposure N	ledium Total	·	1									0.00004
Medium Total				1									0.01
Receptor Total		<del>/</del>				Rece	ptor Risk Total				Rece	eptor Hi Total	0.01

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.4.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenic	: Risk			Non-Carcin	Quotient		
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
urface Soil	Surface Soil	Former Building 234	[Aluminum				1		CNS	0.003			0.003
			Chemical Total						l	0.003			0.003
		Exposure Point Total		1									0.003
	Exposure N	Medium Total		T									0.003
	Air	Former Building 234	Aluminum				1		CNS		0.000004		0.000004
	'	1	Chemical Total	"							0.000004		0.000004
		Exposure Point Total									-		0.000004
	Exposure	Medium Total				-							0.000004
edium Total	<u></u>												0.003

Receptor Risk Total

Medium Total Receptor Total Notes:

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum	*-			T - I		CNS	0.002			0.002
ii		-	Chemical Total							0.002			0.002
	1	Exposure Point Total											0.002
	Exposure M	ledium Total				•							0.002
	Air	Former Building 234	Aluminum				- 1		CNS		0.000004		0.000004
11			Chemical Total						]		0.000004		0.000004
i		Exposure Point Total											0.000004
	Exposure M	Medium Total											0.000004
Medium Total													0.002
Receptor Total				•		Rece	ptör Risk Total				Rec	eptor HI Total	0.002
Notari													

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation I	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum						CNS	0.009			0.009
i	1		Chemical Total							0.009			0.009
		Exposure Point Total											0.009
1	Exposure N	Medium Total											0.009
<u> </u>	Air	Former Building 234	Aluminum						CNS		0.00004		0.00004
1	į.		Chemical Total						ŀ		0.00004		0.00004
1		Exposure Point Total		]									0.00004
<b></b>	Exposure N	dedium Total		1							•		0.00004
Medium Total						-	` .						0.009
Receptor Total				<del>'</del>		Rece	ptor Risk Total				Rec	eptor HI Total	0.009
Notes:								_					

Notes

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.7.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	c Risk			Non-Carcin	nogenic Hazard	Quotient	
		<u> </u>	Concem	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Áluminum				- 1		CNS	0.02			0.02
			Chemical Total						1	0.02			0.02
<u> </u>		Exposure Point Total	•										0.02
l <del>l</del>	Exposure	Medium Total											0.02
l!	Air	Former Building 234	Aluminum						CNS		0.2		0.2
<b> </b>  -	1		Chemical Total						Ì		0.2		0.2
		Exposure Point Total											0.2
	Exposure	Medium Total		····	•					<del></del>			0.2
Medium Total		•	·							-			0.2
Receptor Total						Rece	ptor Risk Total				Rec	eptor HI Total	0.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	Risk		Non-Carcinogenic Hazard Quotient					
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Former Building 234	Aluminum				I		CNS	0.1			0.1	
1			Chemical Total							0.1		1	0.1	
1		Exposure Point Total		]			. "						0.1	
1	Exposure N	Medium Total						1.5					0.1	
tl .	Air	Former Building 234	Aluminum						CNS		0.0002		0.0002	
1	f		Chemical Total								0.0002		0.0002	
ŀ		Exposure Point Total		1									0.0002	
li .	Exposure N	Medium Total		1		-							0.0002	
Medium Total				1									0.1	
Receptor Total						Rece	ptor Risk Total				Rec	eptor HI Total	0.1	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	c Risk		Non-Carcinogenic Hazard Quotient					
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Former Building 234	Aluminum				I		CNS	0.01	*-		0.01	
		_	Chemical Total							0.01			0.01	
1		Exposure Point Total	·										0.01	
	Exposure N	Medium Total											0.01	
	Āir	Former Building 234	Aluminum				1		CNS		0.0002		0.0002	
			Chemical Total								0.0002		0.0002	
		Exposure Point Total		1									0.0002	
		Medium Total	-										0.0002	
Medium Total													0.01	
Receptor Total	····					Rece	otor Risk Total				Rece	eptor HI Total	0.01	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

**South Waterfront** 

# LIST OF TABLES RAGS PART D TABLE 9 - SOUTH WATERFRONT SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.	
	Reasonable Maximum Exposures
9.1.RME	Future Adolescent Trespassers - South Waterfront
9.2.RME	Future Adult Trespassers - South Waterfront
9.3.RME	Future Industrial Workers - South Waterfront
9.4.RME	Current/Future Construction Workers - North Waterfront
9.5.RME	Hypothetical Child Residents - South Waterfront
9.6.RME	Hypothetical Adult Residents - South Waterfront

# TABLE 9.1.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

PAGE 1 OF 1

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese				I		CNS	0.008			0.008
li .			Chemical Total					4.4	),	0.008			0.008
		Exposure Point Total											0.008
	Exposure	Medium Total											0.008
1	Air	South Waterfront	Manganese	3			1		CNS		0.00003		0.00003
			Chemical Total								0.00003		0.00003
		Exposure Point Total		1									0.00003
	Exposure	Medium Total						**					0.00003
Medium Total	· · · · · · · · · · · · · · · · · · ·	-								•			0.008
Receptor Total			· · · · · · · · · · · · · · · · · · ·			Rece	otor Risk Total				Rec	eptor HI Total	0.008

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.2.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure <b>M</b> edium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese				1		CNS	0.005			0.005
			Chemical Total							0.005			0.005
		Exposure Point Total						<u> </u>					0.005
1	Exposure I	Medium Total											0.005
	Air	South Waterfront	Manganese				I		CNS		0.00003		0.00003
			Chemical Total								0.00003		0.00003
		Exposure Point Total									•		0.00003
	Exposure I	Medium Total		7									0.00003
Medium Total										_			0.005
Receptor Total	•				-	Rece	ptor Risk Total				Rec	eptor HI Total	0.005

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.3.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenie	c Risk		Non-Carcinogenic Hazard Quotient					
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese		**				CNS	0.03			0.03	
			Chemical Total							0.03			0.03	
		Exposure Point Total											0.03	
	Exposure	Exposure Medium Total											0.03	
	Air	South Waterfront	Manganese				T - I		CNS		0.0003		0.0003	
			Chemical Total								0.0003		0.0003	
		Exposure Point Total	·					:					0.0003	
	Exposure	Medium Total					i						0.0003	
Medium Total													0.03	
Receptor Total	•					Rece	ptor Risk Total				Rec	eptor HI Total		

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.4.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	Risk			Non-Carcir	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese				- 1		CNS	0.05			0.05
			Chemical Total							0.05			0.05
		Exposure Point Total	•									· · · · · · · · · · · · · · · · · · ·	0.05
	Exposure	Medium Total	· · · · · · · · · · · · · · · · · · ·										0.05
	Air	South Waterfront	Manganese				- 1		CNS		1		1
			Chemical Total	j							1		1
		Exposure Point Total		1									1
	Exposure	Medium Total											1
Medium Total			-		-	•							1
Receptor Total						Rece	tor Risk Total				Rece	eptor HI Total	1

Noties:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.5.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk			Non-Carcii	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese				T I		CNS	0.4			0.4
			Chemical Total						1	0.4		0.4	
1		Exposure Point Total				0.4							
<u> </u>	Exposure f	Medium Total										Dermal	0.4
ii .	Air	South Waterfront	Manganese	3			I		CNS		0.001		0.001
1			Chemical Total	J							0.001		0.001
1		Exposure Point Total											0.001
	Exposure	Medium Total		T									0.001
Medium Total				1									0.4
Receptor Total			-	· ·		Rece	ptor Risk Total				Rec	eptor HI Total	0.4

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

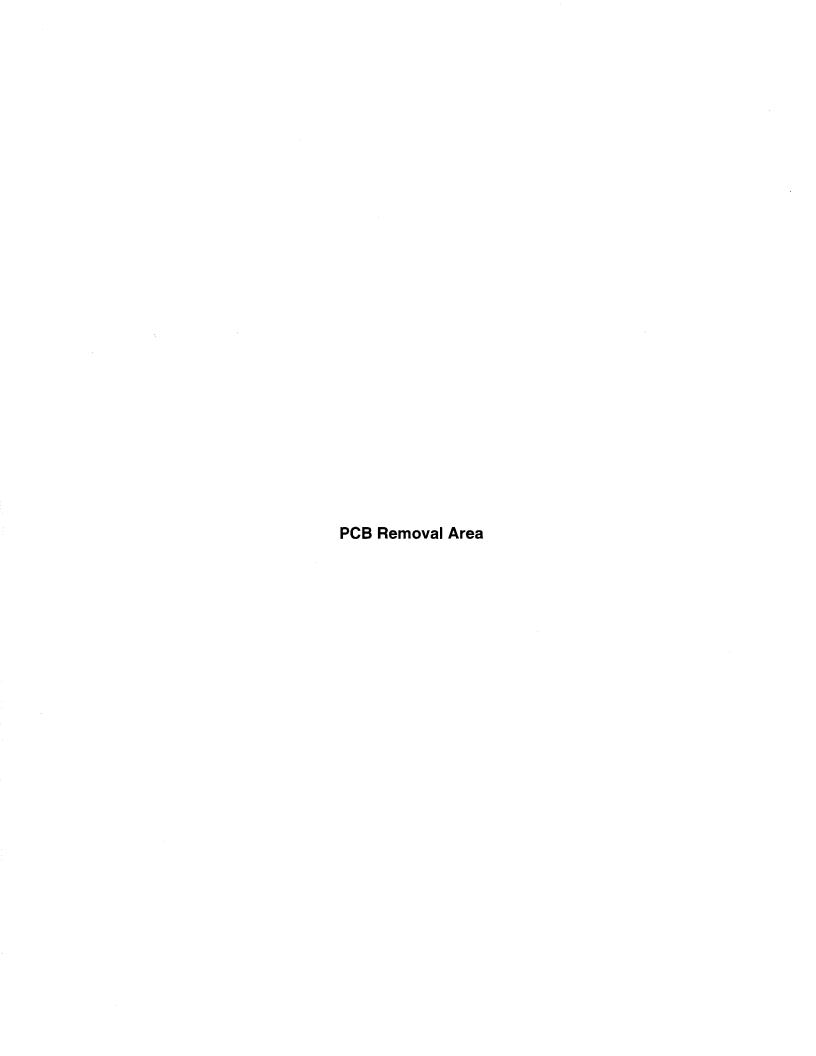
PAGE 1 OF 1

Scenario Timeframe: Hypothetical Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese				1		CNS	0.04			0.04
I	<u></u>		Chemical Total						l	0.04			0.04
N.		Exposure Point Total											0.04
1	Exposure N	fedium Total											0.04
1	Air	South Waterfront	Manganese						CNS		0.001		0.001
1			Chemical Total						l		0.001		0.001
1	1	Exposure Point Total		]									0.001
1	Exposure N	Medium Total								•			0.001
Medium Total										-			0.04
Receptor Total						Rece	ptor Risk Total				Rec	eptor HI Total	0.04

Notes

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).



# LIST OF TABLES RAGS PART D TABLE 9 - PCB REMOVAL AREA SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.	
	Reasonable Maximum Exposures
9.1.RME	Current Adolescent Trespassers - PCB Removal Area
9.2.RME	Current Adult Trespassers - PCB Removal Area
9.3.RME	Current Lifelong Trespassers - PCB Removal Area
9.4.RME	Current Industrial Workers - PCB Removal Area
9.5.RME	Future Adolescent Trespassers - PCB Removal Area
9.6.RME	Future Adult Trespassers - PCB Removal Area
9.7.RME	Future Lifelong Trespassers - PCB Removal Area
9.8.RME	Future Industrial Workers - PCB Removal Area
9.9.RME	Current/Future Construction Workers - North Waterfront
9.10.RME	Hypothetical Child Residents - PCB Removal Area
9.11.RME	Hypothetical Adult Residents - PCB Removal Area
9.12.RME	Hypothetical Lifelong Residents - PCB Removal Area

## TABLE 9.1.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current Receptor Population: Trespasser Receptor Age: Adolescent

AGE	ı	O٢	ı

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk			Non-Carcin	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum						CNS	0.003			0.003
1			Chromium	9E-07				9E-07	None Specified	0.001			0.001
1			Chemical Total	9E-07			1	9E-07		0.005			0.005
1		Exposure Point Total	*					9E-07		_			0.005
1	Exposure	Medium Total		T				9E-07					0.005
	Air	PCB Removal Area	Aluminum		T				CNS		0.000005		0.000005
1			Chromium		1E-09			1E-09	Respiratory		0.0000003		0.0000003
1			Chemical Total		1E-09			1E-09			0.000005		0.000005
1		Exposure Point Total						1Ë-09					0.000005
1	Exposure I	Medium Total						1E-09					0.000005
Medium Total								9E-07					0.005
Receptor Total			· · ·			Rece	ptor Risk Total	9E-07			Rec	eptor HI Total	0.005

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.2.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population; Trespassers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	c Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum		-		T I	**	CNS	0.002			0.002
			Chromium	4E-07			<u> </u>	4E-07	None Specified	0.0010			0.0010
		_	Chemical Total	4E-07		,	][	4E-07		0.003			0.003
		Exposure Point Total						4E-07					0.003
	Exposure	Medium Total						4E-07					0.003
	Air	PCB Removal Area	Aluminum					*-	CNS		0.000005		0.000005
			Chromium		8E-10		l <u>l</u>	8E-10	Respiratory		0.0000003		0.0000003
			Chemical Total		8E-10		1 [	8E-10			0.000005	į	0.000005
		Exposure Point Total						8E-10					0.000005
	Exposure 1	Medium Total						8E-10					0.000005
Medium Total								4E-07					0.003
Receptor Total				•		Rece	ptor Risk Total	4E-07			Rec	eptor HI Total	0.003

1 - Mulagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.3.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	: Risk	<u> </u>		Non-Carcin	ogenic Hazard	Quotient	
	1		Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil S	Surface Soil	PCB Removal Area	Aluminum Chromium	1E-06				1E-06				•	
ŀ		Exposure Point Total	Chemical Total	1E-06				1E-06					
		J				1E-06							
	Exposure N	Medium Total		]			(	1E-06					
1	Air	PCB Removal Area	Aluminum										
1			Chromium		2E-09		I 1	2E-09	H				
		_	Chemical Total	]	2E-09		[	2E-09	3				
1		Exposure Point Total						2E-09	1				
		Medium Total						2E-09			·		
Medium Total				3				1E-06				•	
Receptor Total						Rece	ptor Risk Total	1E-06					T
Notes:													

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.4.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current Receptor Population: Industrial Workers Receptor Age: Adult

PAGE 1 OF 1

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	nogenic Hazard	Quotient	
		,	Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum						CNS	0.01			0.01
H			Chromium	3E-06			1 1	3E-06	None Specified	0.005		-	0.005
li .			Chemical Total	3E-06				3E-06		0.02			0.02
		Exposure Point Total						3E-06			•		0.02
В		Medium Total			•			3E-06					0.02
	Air	PCB Removal Area	Aluminum	T "					CNS		0.00005		0.00005
1			Chromium	JI	1E-08		1	1E-08	Respiratory		0.000003		0.000003
			Chemical Total	J	1E-08			1Ë-08			0.00005		0.00005
l		Exposure Point Total						1E-08					0.00005
	Exposure N	Medium Total						1E-08					0.00005
Medium Total								3E-06	<u> </u>				0.02
Receptor Total						Rece	otor Risk Total	3E-06			Rec	eptor HI Total	0.02
Notes:													•

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.5. PME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespasser Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk			Non-Carcir	nogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum						CNS	0.003			0.003
	[		Chromium	9E-07			1	9E-07	None Specified	0.001			0,001
		1	Chemical Total	9E-07				9E-07	1	0.005			0.005
		Exposure Point Total	•					9E-07					0.005
ll	Exposure N	Medium Total		1				9E-07					0.005
ŀ	Air	PCB Removal Area	Aluminum			-			CNS		0.000005		0.000005
<u> </u>			Chromium	J	1E-09		1	1E-09	Respiratory		0.0000003		0.0000003
	1		Chemical Total	<u> </u>	1E-09			1E-09	1		0.000005		0.000005
li.	i	Exposure Point Total	·	i				1E-09					0.000005
L	Exposure N	Medium Total						1E-09					0.000005
Medium Total				10	-			9E-07					0.005
Receptor Total						Rece	ptor Risk Total	9E-07			Rec	eptor HI Total	0.005

Notes:

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.6.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Adult PAGE 1 OF 1

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio					nogenic Hazard		
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum				1		CNS	0.002			0.002
			Chromium	4E-07				4E-07	None Specified	0.0010			0.0010
			Chemical Total	4E-07				4E-07	1	0.003			0.003
ŀ		Exposure Point Total		1				4E-07					0.003
ŀ	Exposure N	ledium Total						4E-07					0.003
ľ	Air	PCB Removal Area	Aluminum				T		CNS		0.000005		0.000005
			Chromium		8E-10			8E-10	Respiratory		0.0000003		0.0000003
			Chemical Total		8E-10	~-		8E-10			0.000005		0.000005
		Exposure Point Total		]				8E-10					0.000005
	Exposure M	ledium Total						8E-10					0.000005
Medium Total				1				4E-07					0.003
Receptor Total				•		Rece	otor Risk Total	4E-07				eptor HI Total	0.003
Notes:													

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.7.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Trespassers Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio	: Risk			Non-Carcin	ogenic Hazard	Quotient	
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
urface Soil	Surface Soil	PCB Removal Area	Aluminum Chromium	1E-06				1E-06					
			Chemical Total	1E-06				1E-06					
H		Exposure Point Total						1E-06					
1	Exposure N	fedium Total						1E-06					
1	Air	PCB Removal Area	Aluminum				1						
Į.			Chromium		2E-09		1 1	2E-09					
			Chemical Total		2E-09		~-	2E-09					
ii		Exposure Point Total						2É-09					
	Exposure N	Medium Total						2E-09					
Medium Total	·		•					1E-06					
Receptor Total						Rece	otor Risk Total	1E-06					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.8.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Industrial Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogenio			Non-Carcinogenic Hazard Quotient				
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum				**		CNS	0.01		**	0.01
1	I.		Chromium	3E-06			~-	3E-06	None Specified	0.005			0.005
ll .			Chemical Total	3E-06				3E-06		0.02			0.02
		Exposure Point Total		1				3E-06					0.02
1	Exposure M	ledium Total						3E-06					0.02
	Air	PCB Removal Area	[Aluminum						CNS		0.00005		0.00005
il .			Chromium		1E-08			1E-08	Respiratory		0.000003		0.000003
1			Chemical Total	<u></u>	1E-08		1	1E-08	1		0.00005		0.00005
[]		Exposure Point Total		]				1E-08					0.00005
L	Exposure N	fedium Total						1E-08					0.00005
Medium Total				J				3E-06		-			0.02
Receptor Total						Rece	otor Risk Total	3E-06	Ì		Rec	eptor HI Total	0.02
Notes:												<del></del>	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# TABLE 9.9.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future Receptor Population: Construction Workers Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential			Carcinogeni	c Risk		Non-Carcinogenic Hazard Quotient				
	Mediani		Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum						CNS	0.02			0.02
1			Chromium	2E-07			]	2E-07	None Specified	0.001			0.001
			Chemical Total	2E-07			[	2E-07		0.02			0.02
		Exposure Point Total						2E-07					0.02
	Exposure	Medium Total						2E-07					0.02
	Air	PCB Removal Area	Aluminum				1		CNS		0.2		0.2
			Chromium		2E-06		1 L	2E-06	Respiratory		0.01		0.01
			Chemical Total		2E-06		[	2E-06	1		0.2		0.2
		Exposure Point Total						2E-06					0.2
	Exposure I	Medium Total						2E-06					0.2
Medium Total	-,'\		<del></del>					2E-06					0.2
Receptor Total			···			Rece	ptor Risk Total	2E-06			Rece	eptor HI Total	0.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.10.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Child

Medium	Exposure Medium	Exposure Point			Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum				- 1		CNS	0.2			0.2
			Chromium	5E-05			- L	5E-05	None Specified	0.07			0.07
			Chemical Total	5E-05				5Ē-05		0.2			0.2
		Exposure Point Total	•					5E-05					0.2
	Exposure	Medium Total						5E-05		-			0.2
	Air	PCB Removal Area	Aluminum		T				CNS		0.0002		0.0002
		l	Chromium		5E-08		1 1	5E-Q8	Respiratory		0.00001		0.00001
	i.		Chemical Total		5E-08		1	5E-08			0.0002		0.0002
	1	Exposure Point Total						5E-08					0.0002
	Exposure	Medium Total		Ti				5E-08					0.0002
Medium Total								5E-05					0.2
Receptor Total						Bece	ptor Risk Total	5E-05			Rece	eptor HI Total	0.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.11.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Adult

Medium	Exposure Exposure Medium Point		Chemical of Potential			Carcinogeni	Risk		Non-Carcinogenic Hazard Quotient				
_			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum						CNS	0.02			0.02
			Chromium	7E-06			]	7E-06	None Specified	0.007			0.007
	1		Chemical Total	7E-06				7E-06	1	0.02			0.02
ľ	1	Exposure Point Total						7E-06					0.02
j	Exposure	Medium Total		1				7E-06					0.02
1	Air	PCB Removal Area	[Aluminum		* *				CNS		0.0002		0.0002
1			Chromium		7E-08		1	7E-08	Respiratory		0.00001		0.00001
1			Chemical Total		7E-08			7E-08			0.0002		0.0002
1		Exposure Point Total						7E-08					0.0002
ł .	Exposure	Medium Total						7E-08		•	•		0.0002
Medium Total				1				7Ĕ-06	· · · -				0.02
Receptor Total	·	· · · · · · · · · · · · · · · · · · ·				Rece	otor Risk Total	7E-06			Rec	eptor HI Total	0.02

Notes:

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

## TABLE 9.12.RME SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs REASONABLE MAXIMUM EXPOSURES FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future Receptor Population: Residents Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential	of Potential						Non-Carcinogenic Hazard Quotient				
			Concern	Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	PCB Removal Area	Aluminum Chromium	5E-05				5E-05						
	1		Chemical Total	5E-05	Ī		[	5E-05						
li .	<u></u>	Exposure Point Total		ــــــال				5E-05						
li	Exposure N	Medium Total			_			5E-05						
	Air	PCB Removal Area	Aluminum					**			1		7	
1			Chromium	<b></b>	1E-07		1	1E-07			<u> </u>			
			Chemical Total		1E-07			1E-07						
1	L	Exposure Point Total						1E-07						
	Exposure N	/ledium Total	<del>-</del> :					1E-07					]	
Medium Total			_					5E-05						
Receptor Total					•	Rece	otor Risk Total	5E-05						

Notes:

<sup>1 -</sup> Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

# APPENDIX G BACKGROUND ANALYSIS

### **Background Evaluation**

Based on comments received from EPA and RIDEM and the discussions at the March 2012 RPM meeting, Navy utilized the NAVSTA Newport Basewide Background Study to establish a background dataset for metals in soil that were determined to be risk drivers or considered background based on the previous geochemical analysis that was conducted. Navy used the ProUCL software program to calculate the Upper Predictive Limit to be used as a background threshold value (BTV) for Site 19 – On-Shore Derecktor Shipyard.

The EPA ProUCL Fact Sheet

(http://www.epa.gov/nerlesd1/tsc/ProUCL\_v4.00.05/ProUCL\_v4.0\_Facts\_Sheet.pdf) states:

ProUCL 4.0 can be used to compute several parametric and nonparametric upper limits that are used to estimate the BTVs or not-to-exceed values for data sets with NDs and without NDs. These upper limits include: upper prediction limits (UPLs), upper tolerance limits (UTLs), and upper percentiles. Some of the nonparametric methods such as the Kaplan-Meier (Meier, 1958) method and ROS methods are applicable on left-censored data sets having multiple detection limits. The background statistics as incorporated in ProUCL 4.0 are particularly useful when individual site observations from some impacted site areas (perhaps after some remediation activities) are to be compared with BTVs to determine if adequate amount of remediation and cleanup has been performed yielding remediated site concentrations comparable to background level concentrations; that is if the site concentrations can be considered as coming from (or approaching to) the population of background concentrations.

Navy will calculated UPLs from the base background dataset for all surface and subsurface soil types. The soil types were combined because the soil type at Site 19 is classified as urban fill and is likely a combination of different soil types from other portions of NAVSTA Newport. Table 1 presents the calculated UPL values for metals that were determined to be risk drivers or were considered within background levels by the geochemical analysis and the ProUCL output file.

In response to Navy's suggestion to use UPLs to establish background values, RIDEM requested that the arsenic values be adjusted. Based on RIDEM's evaluation of the background data for arsenic using the ProUCL software program, RIDEM requested that the Navy revise the UPLs for arsenic in the SASE Addendum to 13 mg/kg for surface soils and 20 mg/kg for subsurface soils. In surface soils, both Beach and Stissing Silt Loam were determined to be unrepresentative soil types for site-wide soil conditions. Beach soils were considered unrepresentative because concentrations of aluminum, arsenic, chromium, and cobalt were many times lower than concentrations observed in all other soil types. Stissing silt loam was considered unrepresentative due to elevated concentrations of arsenic, chromium, cobalt, and iron, as compared to other soil types. Several of these elevated concentrations were also determined to be outliers. Therefore, the value of 13 mg/kg for surface soil was calculated by eliminating Beach (Ba) and Stissing Silt Loam (Se) soils from the input to ProUCL.

In subsurface soils, Mansfield Mucky Silt Loam and Stissing Silt Loam were determined to be unrepresentative of site-wide soil conditions due to elevated concentrations of arsenic and cobalt, as compared to concentrations observed in other soil types. Therefore, the 20 mg/kg result for subsurface soils was determined by excluding the Mansfield Mucky Silt Loam (Ma) and Stissing Silt Loam (Se) background data. The following tables contain summary statistics for each of the soil types in the base backgorund dataset.

### SURFACE SOIL

Soil Type	Navy Proposed	Outlier Values	With (mg/kg		Outliers	Withou (mg/kg		Outliers
<i>,</i>	UPL (mg/kg)	(mg/kg)	Mea n	Max	UPL	Mea n	Max	UPL
All soils	18	71.7; 23.5; 22.5	7.07	71.7	17.7	6.21	17.1	14.7
All except Beach and Stissing Silt Loam	18	22.5	6.59	22.5	13.9	6.39	17.1	13.2
Beach soils	18	none	1	1.3	1.29	1.00	1.3	1.29
Mansfield Mucky Silt Loam	18	22.5	7.05	22.5 0	16	6.24	13	12
Merrimack sandy loam	18	none	4.03	6	6.05	4.03	6	6.05
Newport silt loam	18	none	6.28	17.1	16.7	6.3	17.1	16.7
Pittstown silt loam	18	none	9.04	15	14.5	9.0	15	14.5
Stissing silt loam	18	71.7; 23.5	13	72	69.3	9.16	16.3	15.2

### SUBSURFACE SOIL

Soil Type	Navy Proposed	Outlier Values	With (mg/kg		Outliers		Without Outlie (mg/kg)		
,,	(mg/kg)	(mg/kg)	Mea n	Max	UPL	Mea n	Max	UPL	
All soils	29	42.6; 38.7; 37.9	10.9	42.6	27.2	9.97	28.9	23.7	
All except Mansfield and Stissing silt loams	29	none	7.87	23.5	20.5	7.9	23.5	20.5	
Mansfield Mucky Silt Loam	29	none	16.5	42.6	37.8	16.5	42.6	37.8	
Merrimack sandy loam	29	none	4	6.7	5.65	4	6.7	5.65	
Newport silt loam	29	17.7	4.36	17.7	9.28	3.69	5.8	6.44	
Pittstown silt loam	29	none	14.2	23.5	22.8	14.2	23.5	22.8	
Stissing silt loam	29	none	16.4	27.3	31.4	16.4	27.3	31.4	

RIDEM suggested that the Navy use UPLs of 13 mg/kg for surface soil and 20 mg/kg for subsurface soil for arsenic in the Draft Final SASE Addendum. Navy agreed with RIDEM's suggestion

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		General Background	Statistics	for Data S	ets with Non-Det	tects	
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	Confidence Coefficient	95%					
	Coverage	90%					
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ヿ	Total Nur	nber of Observations	30		Numbe	r of Distinct Observations	28
ヿ		Tolerance Factor	1.777				
ヿ							
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		99% Percentile (z)  ribution Test  k star  Theta Star  MLE of Mean of Standard Deviation  nu star	3.42 2654 9079 4909 205.2	Da	ita appear Norm	95% Percentile (z) 99% Percentile (z) 99% Percentile (z) Pistribution Test al at 5% Significance Lev	22024 33668
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	MLE o	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 6% A-D Critical Value	3.42 2654 9079 4909 205.2 1.214 0.75	Da	ita appear Norm	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Pistribution Test al at 5% Significance Lev  ametric Statistics 90% Percentile	22024 33668 /el
	MLE (	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 6% A-D Critical Value K-S Test Statistic	3.42 2654 9079 4909 205.2 1.214 0.75 0.202	Da	ita appear Norm	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Pistribution Test al at 5% Significance Lev  ametric Statistics 90% Percentile 95% Percentile	22024 33668 /el 13530 13800
	MLE (	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 6% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	3.42 2654 9079 4909 205.2 1.214 0.75 0.202 0.161	Da	ita appear Norm	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Pistribution Test al at 5% Significance Lev  ametric Statistics 90% Percentile	22024 33668 /el 13530 13800
	MLE (	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 6% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	3.42 2654 9079 4909 205.2 1.214 0.75 0.202 0.161	Da	ita appear Norm	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Pistribution Test al at 5% Significance Lev  ametric Statistics 90% Percentile 95% Percentile	22024 33668 /el 13530 13800
	MLE o	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 6% A-D Critical Value K-S Test Statistic 5% K-S Critical Value ad at 5% Significance	3.42 2654 9079 4909 205.2 1.214 0.75 0.202 0.161	Da	nta appear Norm	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Pistribution Test al at 5% Significance Lev  ametric Statistics 90% Percentile 95% Percentile 99% Percentile	22024 33668 /el 13530 13800 13942
	MLE (	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 6% A-D Critical Value K-S Test Statistic 5% K-S Critical Value ad at 5% Significance	3.42 2654 9079 4909 205.2 1.214 0.75 0.202 0.161 <b>b. Level</b>		Nonpara	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Pistribution Test al at 5% Significance Lev  ametric Statistics 90% Percentile 95% Percentile 99% Percentile	22024 33668 /el 13530 13800 13942
	MLE o	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value ad at 5% Significance sima Distribution 90% Percentile	3.42 2654 9079 4909 205.2 1.214 0.75 0.202 0.161 <b>ELevel</b>	95% Perci	Nonpara 95% tentile Bootstrap t	95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 90% Percentile 95% Percentile 95% Percentile 99% Percentile 99% Percentile	22024 33668 /el 13530 13800 13842 13800 13820
	MLE o	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value ed at 5% Significance  Ima Distribution 90% Percentile 95% Percentile	3.42 2654 9079 4909 205.2 1.214 0.75 0.202 0.161 <b>ELevel</b>	95% Perci	Nonpara 95% tentile Bootstrap t	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Pistribution Test al at 5% Significance Lev  Pistribution Test al at 5% Significance Lev  Pistribution Test al at 5% Significance Lev  Pistribution Test al at 5% Percentile 95% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage UTL with 90% Coverage UTL with 90% Coverage	22024 33668 /el 13530 13800 13942 13800 13820 13820
	MLE o	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value ad at 5% Significance sima Distribution 90% Percentile	3.42 2654 9079 4909 205.2 1.214 0.75 0.202 0.161 <b>ELevel</b>	95% Perci	Nonpara 95% tentile Bootstrap t	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test Distribution Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Distribution Test Distribution Distribution Test Distribution Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Distribution Test Distribution Distri	22024 33668 /el 13530 13800 13942 13800 13820 13820 13890
	MLE o	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value ad at 5% Significance  Ima Distribution 90% Percentile 95% Percentile	3.42 2654 9079 4909 205.2 1.214 0.75 0.202 0.161 <b>ELevel</b> 15662 18362 24174	95% Perci	Nonpara  95% tentile Bootstrap	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test Distribution Distribution Test Distribution Distribution Distribution Test Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distr	22024 33668 /el 13530 13800 13942 13800 13820 13820 13890 26045
	MLE of State	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 6% A-D Critical Value K-S Test Statistic 5% K-S Critical Value ad at 5% Significance ama Distribution 90% Percentile 95% Percentile	3.42 2654 9079 4909 205.2 1.214 0.75 0.202 0.161 3 Level 15662 18362 24174	95% Perci	Nonpara  95% tentile Bootstrap	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test Distribution Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Distribution Test Distribution Distribution Test Distribution Distribution Test Distribution Test Distribution Test Distribution Test Distribution Test Distribution Distribution Test Distribution Distri	22024 33668 /el 13530 13800 13942 13800 13820 13820 13890 26045
	Data not Gamma Distribute  Assuming Gam  95% WH	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 6% A-D Critical Value K-S Test Statistic 6% K-S Critical Value ad at 5% Significance  Ima Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile	3.42 2654 9079 4909 205.2 1.214 0.75 0.202 0.161 <b>ELEVEL</b> 15662 18362 24174	95% Perci	Nonpara  95% tentile Bootstrap	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test Distribution Distribution Test Distribution Distribution Distribution Test Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distr	22024 33668 /el 13530 13800 13942 13800 13820 13820 13890 26045
	MLE of State	ribution Test  k star Theta Star MLE of Mean of Standard Deviation nu star  A-D Test Statistic 6% A-D Critical Value K-S Test Statistic 5% K-S Critical Value ad at 5% Significance ma Distribution 90% Percentile 95% Percentile 99% Percentile 4Approx. Gamma UPL Approx. Gamma UPL With 90% Coverage	3.42 2654 9079 4909 205.2 1.214 0.75 0.202 0.161 <b>ELEVEL</b> 15662 18362 24174 18681 19446 19063	95% Perci	Nonpara  95% tentile Bootstrap	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test al at 5% Significance Lev  Distribution Test Distribution Distribution Test Distribution Distribution Distribution Test Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distribution Distr	22024 33668 /el 13530 13800 13942 13820 13820 13820 13890 26045

	Y	,		r
⇉		ı		
	M MG/KG ALUMINUM  (so_sb)			
Ŧ	MING/ACIALOMINOMI (30_3D)			
			Statistics	
_	Total Number of Observations		Number of Distinct Observations	61
4	Tolerance Factor	1.524		
$\dashv$	Raw Statistics		Log-Transformed Statistics	
1	Minimum	5520	Minimum	8.616
1	Maximum	14200	Maximum	
	Second Largest		Second Largest	
_	First Quartile		First Quartile	
4	Median Third Quartile		Median	
+		10315	Third Quartile Mean	
+		1551		0.159
7	Coefficient of Variation			000
	Skewness	-0.229		
4				
4		Backgroui	nd Statistics	
$\dashv$	Normal Distribution Test  Lilliefors Test Statistic	0.116	Lognormal Distribution Test  Lilliefors Test Statistic	0 1/6
$\dashv$	Lilliefors Critical Value		Lilliefors Critical Value	-
7	Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Lev	
	Assuming Normal Distribution		Assuming Lognormal Distribution	
_	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
4	95% UPL (t) 90% Percentile (z)		95% UPL (t) 90% Percentile (z)	
+	95% Percentile (z)		95% Percentile (z)	
$\dashv$	99% Percentile (z)		99% Percentile (z)	
	30 / 01 01 00 00 00 00 00 00 00 00 00 00 00	.0020	00701 0100111110 (2)	
	Gamma Distribution Test		Data Distribution Test	
	k star		Data do not follow a Discernable Distribution (	0.05)
	Theta Star			
,	MLE of Mean  MLE of Standard Deviation			
	nu star			
,	nu star	0107		
,	A-D Test Statistic	1.035	Nonparametric Statistics	
¥	5% A-D Critical Value		90% Percentile	12030
à	K-S Test Statistic		95% Percentile	
	5% K-S Critical Value		99% Percentile	14002
	Data not Gamma Distributed at 5% Significance	Level		
-	Assuming Gamma Distribution		95% UTL with 90% Coverage	12400
,	90% Percentile	12431	95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
	99% Percentile		95% UPL	13075
I			95% Chebyshev UPL	
,	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	14379
	95% HW Approx. Gamma UPL			
	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage			
+	50% THY Approx. Gailling OTE Will 50% Coverage	12002	<u>,                                      </u>	
,	M MG/KG ALUMINUM  (so_ss)			
$\dashv$	minional (30_33)			
		General	Statistics	
	Total Number of Observations		Number of Distinct Observations	86
и 2	Total Number of Observations Tolerance Factor	115		

	Y F C P I			r
1 2 0	Raw Statistics		Log-Transformed Statistics	
	Minimum	3710	Minimum	g 210
	Maximum		Maximum	
1 1 1	Second Largest		Second Largest	
	First Quartile		First Quartile	
	First Quartile Median		First Quartile Median	
1 1 4	Third Quartile		Third Quartile	
1 1 4		11056	Mean	
		3335	SD	0.378
	Coefficient of Variation			
	Skewness	-0.513		
			10. 4.4	
		Backgrour	nd Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
	Lilliefors Test Statistic		Lilliefors Test Statistic	
	Lilliefors Critical Value		Lilliefors Critical Value	
	Data not Normal at 5% Significance Leve	l	Data not Lognormal at 5% Significance Lev	el
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
1.1	95% Percentile (z)	16542	95% Percentile (z)	
	99% Percentile (z)	18814	99% Percentile (z)	25083
	Gamma Distribution Test		Data Distribution Test	
	k star		Data do not follow a Discernable Distribution (	0.05)
	Theta Star	1331		
1 4 3	MLE of Mean	11056		
	MLE of Standard Deviation	3836		
	nu star	1911		
	A-D Test Statistic	4.181	Nonparametric Statistics	
	5% A-D Critical Value	0.753	90% Percentile	15160
	K-S Test Statistic	0.159	95% Percentile	15650
	5% K-S Critical Value	0.0856	99% Percentile	17058
	Data not Gamma Distributed at 5% Significance	Level		
1 4 3	Assuming Gamma Distribution		95% UTL with 90% Coverage	
* *	90% Percentile	16168	95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
1 3 *	99% Percentile	21871	95% UPL	
1 3 1			95% Chebyshev UPL	25656
1 3 3	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	19730
1 3 7	95% HW Approx. Gamma UPL	10270		
	• • • • • • • • • • • • • • • • • • • •			
1 3 1	95% WH Approx. Gamma UTL with 90% Coverage	17254		
1 3 4	• • • • • • • • • • • • • • • • • • • •	17254		
1 3 4	95% WH Approx. Gamma UTL with 90% Coverage	17254		
1 3 4	95% WH Approx. Gamma UTL with 90% Coverage	17254		
1 3 T	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	17254		
1 2 4	95% WH Approx. Gamma UTL with 90% Coverage	17254		
1 2 4 1 2 4 1 3 4 1 3 6 1 3 6	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	17254 17489		
	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ANTIMONY  (br_na)	17254 17489 General	Statistics	
	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ANTIMONY  (br_na)  Number of Valid Data	17254 17489 <b>General</b> 30	Number of Detected Data	
	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ANTIMONY  (br_na)  Number of Valid Data Number of Distinct Detected Data	17254 17489 <b>General</b> 30 2	Number of Detected Data Number of Non-Detect Data	
	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ANTIMONY  (br_na)  Number of Valid Data Number of Distinct Detected Data  Warning: Da	17254 17489 General 30 2 ta set has	Number of Detected Data Number of Non-Detect Data only 2 Detected Values.	
	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KGIANTIMONYI (br_na)  Number of Valid Data Number of Distinct Detected Data Warning: Data This is not enough to compute	General 30 2 ta set has meaningful	Number of Detected Data Number of Non-Detect Data only 2 Detected Values. Il and reliable test statistics and estimates.	
	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KGIANTIMONYI (br_na)  Number of Valid Data Number of Distinct Detected Data Warning: Data This is not enough to compute	General 30 2 ta set has meaningful	Number of Detected Data Number of Non-Detect Data only 2 Detected Values.	
	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ANTIMONY  (br_na)  Number of Valid Data Number of Distinct Detected Data Warning: Da  This is not enough to compute No s	General 30 2 ta set has meaningfustatistics w	Number of Detected Data Number of Non-Detect Data only 2 Detected Values. Il and reliable test statistics and estimates. rill be produced!	28
	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KGIANTIMONYI (br_na)  Number of Valid Data Number of Distinct Detected Data Warning: Data This is not enough to compute	General 30 2 ta set has meaningfustatistics w	Number of Detected Data Number of Non-Detect Data only 2 Detected Values. Il and reliable test statistics and estimates.	28
	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KGIANTIMONYI (br_na)  Number of Valid Data Number of Distinct Detected Data Warning: Da  This is not enough to compute No s	General 30 2 ta set has meaningfustatistics w	Number of Detected Data Number of Non-Detect Data only 2 Detected Values. Il and reliable test statistics and estimates. rill be produced!  Percent Non-Detects	28
1 1 1	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KGIANTIMONYI (br_na)  Number of Valid Data Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics	General 30 2 ta set has meaningfustatistics w	Number of Detected Data Number of Non-Detect Data only 2 Detected Values. If and reliable test statistics and estimates. If iil be produced!  Percent Non-Detects  Log-transformed Statistics	93.33%
1 1 1	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KGIANTIMONYI (br_na)  Number of Valid Data Number of Distinct Detected Data Warning: Da  This is not enough to compute No s	General 30 2 ta set has meaningfustatistics w	Number of Detected Data Number of Non-Detect Data only 2 Detected Values. Il and reliable test statistics and estimates. rill be produced!  Percent Non-Detects	93.33%

#### Table 2 ProUCL Output

		0.505		0.000
	Mean of Detected		Mean of Detected	
	SD of Detected		SD of Detected	
	Minimum Non-Detect		Minimum Non-Detect Maximum Non-Detect	
1 + 1	Maximum Non-Detect	2.5	Maximum Non-Detect	0.916
	Data with Multiple Detection Limits		Single Detection Limit Scenario	
	Note: Data have multiple DLs - Use of KM Method is	recommen	Number treated as Non-Detect with Single DL	30
	For all methods (except KM, DL/2, and ROS Methods		Number treated as Detected with Single DL	
,	Observations < Largest ND are treated as NDs	,,,	Single DL Non-Detect Percentage	
, , ,			g	
, . ,				
,	Warning: Data se	t has only	2 Distinct Detected Values.	
	This may not be adequate enough to co	ompute me	aningful and reliable test statistics and estimates.	
, , ,	The Project Team may decide to use alternative site	specific v	alues to estimate environmental parameters (e.g., E	PC, BTV)
	Unless Data Quality Objectives (DQOs) ha	ave been n	net, it is suggested to collect additional observations	•
,				
			igh to perform GOF tests, bootstrap, and ROS meth	ods.
	Those methods will r	eturn a 'N/	A' value on your output display!	
	10.15		Part Malara Coulina Islanda and the de	
, , ,			stinct Values for bootstrap methods.	
			9 distinct values may not be reliable.	
, , ,	it is recommended to have 10 to 15 or more	observado	ons for accurate and meaningful results and estimate	<del>3</del> 5.
	•	Backgroup	d Statistics	
, , ,	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	s Only
	Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
1 1 0	5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
, , ,	Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Lev	
, , ,	2 d.d. 1101 1101 110 20 019 11110 20 10 1	<u>'</u>		<u>.                                    </u>
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	DL/2 Substitution Method		DL/2 Substitution Method	
2 2 4	Mean	0.458	Mean (Log Scale)	-0.862
3 3 4	SD	0.205	SD (Log Scale)	
	95% UTL 90% Coverage		95% UTL 90% Coverage	0.864
	95% UPL (t)		95% UPL (t)	
, , ,	90% Percentile (z)	-	90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
, , ,	99% Percentile (z)	0.935	99% Percentile (z)	1.078
	M : 17 E : (M5) M :	<b>1</b> 1/4	1 B00 M # 1	
1 1 1	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	N1/A
, , ,			Mean in Original Scale	N/A
2 1 4			SD in Original Scale Mean in Log Scale	N/A N/A
3 3 3			SD in Log Scale	N/A
			95% UTL 90% Coverage	N/A
			95% UPL (t)	N/A
, , ,			90% Percentile (z)	N/A
			95% Percentile (z)	N/A
, , ,			99% Percentile (z)	N/A
			- ( )	1
, , ,	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values (	Only
111	k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (C	0.05)
	Theta Star	N/A		
	nu star	N/A		
, , ,	A-D Test Statistic	N/A	Nonparametric Statistics	
	5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
L	K-S Test Statistic	N/A	Mean	
	5% K-S Critical Value	N/A		0.00862
	Data not Gamma Distributed at 5% Significance	Level	SE of Mean	
	Acquiring Comment Distribution		95% KM UTL with 90% Coverage	
	Assuming Gamma Distribution		95% KM Chebyshev UPL	U.56 I
2 4 4	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	O E20

#### Table 2 ProUCL Output

	у у с в			r
* 1	Mean	N/A	90% Percentile (z)	N 53 <i>4</i>
	Median	N/A	95% Percentile (z)	
	SD	N/A	99% Percentile (z)	
	k star	N/A	(-)	
	Theta star	N/A	Gamma ROS Limits with Extrapolated Dat	а
. ,	Nu star	N/A	95% Wilson Hilferty (WH) Approx. Gamma UPL	N/A
* 1	95% Percentile of Chisquare (2k)	N/A	95% Hawkins Wixley (HW) Approx. Gamma UPL	N/A
		,	95% WH Approx. Gamma UTL with 90% Coverage	N/A
	90% Percentile	N/A	95% HW Approx. Gamma UTL with 90% Coverage	N/A
	95% Percentile	N/A		
	99% Percentile	N/A		
	Netes DI /0 :- met a meseum de dimento d			
3 0	Note: DL/2 is not a recommended method.			
3 1				
	M MG/KG ANTIMONY  (so_sb)			
3 1	,,			
3 4		General	Statistics	
3 *	Number of Valid Data		Number of Detected Data	
. *	Number of Distinct Detected Data	0	Number of Non-Detect Data	100
1 1				
			erefore all statistics and estimates should also be ND	
			stics are also NDs lying below the largest detection	
	The Project Team may decide to use alternative site	specific v	values to estimate environmental parameters (e.g., E	PC, BT
, ,	The data ant for vericula Mi	MOZOLA	NTIMONIVI (ac. ab) was not presented	
	The data set for variable Mp	MG/KGJAI	NTIMONY  (so_sb) was not processed!	
	M MG/KG ANTIMONY  (so_ss)			
	infine in the partition of the partition			
		General	Statistics	
	Number of Valid Data	115	Number of Detected Data	0
	Number of Distinct Detected Data	0	Number of Non-Detect Data	115
			erefore all statistics and estimates should also be ND	
			stics are also NDs lying below the largest detection	
	I ne Project Team may decide to use alternative site	e specific v	values to estimate environmental parameters (e.g., E	PC, BI
	The data set for variable Mi	MG/KGIAI	NTIMONY  (so_ss) was not processed!	
* 1	The data set for variable Mi	wa/KajA	11 INICIT   (SO_SS) was not processed:	
	M MG/KG ARSENIC  (br_na)			
. ,			Statistics	
	Total Number of Observations		Number of Distinct Observations	30
	Tolerance Factor	1.777		
	B Out I		1 T 1 O	
* 1	Raw Statistics	0.00	Log-Transformed Statistics	4 47
	Minimum		Minimum	
	Maximum Second Largest		Maximum Second Largest	
	Second Largest First Quartile		Second Largest First Quartile	
	First Quartile Median		Median	
. ,	Third Quartile		Third Quartile	
		27.43	Mean	
		23.02		1.468
	Coefficient of Variation		- OB	
	Skewness			
1 3	55	1	ı	l .
		Backgrour	nd Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
	Shapiro Wilk Test Statistic	0.906	Shapiro Wilk Test Statistic	0.878
	·	-		

_	y B C D B			
		0.007		0.007
, ,	Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
	Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Lev	el
	Assuming Normal Distribution	ľ	Assuming Lognormal Distribution	
	95% UTL with 90% Coverage	68.34	95% UTL with 90% Coverage	
	95% UPL (t)		95% UPL (t)	
1 3	90% Percentile (z)		90% Percentile (z)	95.79
7 *	95% Percentile (z)	65.3	95% Percentile (z)	163.3
	99% Percentile (z)	80.99	99% Percentile (z)	443.9
	· ·			
	Gamma Distribution Test		Data Distribution Test	
,	k star	0.854	Data appear Gamma Distributed at 5% Significant	ce Leve
	Theta Star	32.12		
	MLE of Mean	27.43		
	MLE of Standard Deviation	29.68		
	nu star			
3	Tiu Stai	J1.24		
	A-D Test Statistic	O E 4 O	Nonnarametria Statistica	
	5% A-D Critical Value		Nonparametric Statistics	EE 20
-	5% A-D Critical Value  K-S Test Statistic		90% Percentile	
$\rightarrow$			95% Percentile	
_	5% K-S Critical Value		99% Percentile	/5.9
	Data appear Gamma Distributed at 5% Significan	ce Level		
_				
	Assuming Gamma Distribution		95% UTL with 90% Coverage	
*	90% Percentile		95% Percentile Bootstrap UTL with 90% Coverage	69.8
*	95% Percentile	86.92	95% BCA Bootstrap UTL with 90% Coverage	68.8
à	99% Percentile	136.9	95% UPL	73.3
*			95% Chebyshev UPL	129.4
*	95% WH Approx. Gamma UPL	89.35	Upper Threshold Limit Based upon IQR	
٠	95% HW Approx. Gamma UPL			
$\rightarrow$	95% WH Approx. Gamma UTL with 90% Coverage			
		92 46		
	95% HW Approx. Gamma UTL with 90% Coverage			
	95% HW Approx. Gamma UTL with 90% Coverage	102.6	Statistics	
,	95% HW Approx. Gamma UTL with 90% Coverage	102.6 General	Statistics  Number of Distinct Observations	76
,	95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ARSENIC  (so_sb)	102.6  General 100		76
	95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KG ARSENIC  (so_sb)  Total Number of Observations	102.6  General 100		76
,	95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KG ARSENIC  (so_sb)  Total Number of Observations Tolerance Factor	102.6  General 100	Number of Distinct Observations	76
	95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ARSENIC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics	General 100 1.524	Number of Distinct Observations  Log-Transformed Statistics	
	95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ARSENIC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum	General 100 1.524	Number of Distinct Observations  Log-Transformed Statistics  Minimum	0.642
	95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ARSENIC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum	General 100 1.524 1.9 43.6	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum	0.642 3.775
	95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KG ARSENIC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest	General 100 1.524 1.9 43.6 42.6	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest	0.642 3.775 3.752
	95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ARSENIC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile	General 100 1.524 1.9 43.6 42.6 4.3	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile	0.642 3.775 3.752 1.458
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median	General 100 1.524 1.9 43.6 42.6 4.3 7.85	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median	0.642 3.775 3.752 1.458 2.06
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile	0.642 3.775 3.752 1.458 2.06 2.791
	MIMG/KG ARSENIC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	0.642 3.775 3.752 1.458 2.06 2.791 2.096
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	0.642 3.775 3.752 1.458 2.06 2.791
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	0.642 3.775 3.752 1.458 2.06 2.791 2.096
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	0.642 3.775 3.752 1.458 2.06 2.791 2.096
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812 1.514	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	0.642 3.775 3.752 1.458 2.06 2.791 2.096
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812 1.514	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	0.642 3.775 3.752 1.458 2.06 2.791 2.096
	MIMG/KG ARSENIC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812 1.514  Backgroun	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test	0.642 3.775 3.752 1.458 2.06 2.791 2.096 0.792
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic	General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812 1.514  Backgroun 0.16	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  dd Statistics  Lognormal Distribution Test Lilliefors Test Statistic	0.642 3.775 3.752 1.458 2.06 2.791 2.096 0.792
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812 1.514  Backgroun  0.16 0.0886	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	0.642 3.775 3.752 1.458 2.06 2.791 2.096 0.792 0.116 0.0886
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic	General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812 1.514  Backgroun  0.16 0.0886	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  dd Statistics  Lognormal Distribution Test Lilliefors Test Statistic	0.642 3.775 3.752 1.458 2.06 2.791 2.096 0.792 0.116 0.0886
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812 1.514  Backgroun  0.16 0.0886	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	0.642 3.775 3.752 1.458 2.06 2.791 2.096 0.792 0.116 0.0886
	MIMG/KG ARSENIC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Level	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812 1.514  Backgroun  0.16 0.0886	Log-Transformed Statistics  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution	0.642 3.775 3.752 1.458 2.06 2.791 2.096 0.792 0.116 0.0886 <b>el</b>
	MIMG/KGIARSENICI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Level	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812 1.514  Backgroun  0.16 0.0886	Log-Transformed Statistics    Log-Transformed Statistics	0.642 3.775 3.752 1.458 2.06 2.791 2.096 0.792 0.116 0.0886 <b>el</b>
	MIMG/KG ARSENIC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Level	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812 1.514  Backgroun  0.16 0.0886	Log-Transformed Statistics  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution	0.642 3.775 3.752 1.458 2.06 2.791 2.096 0.792 0.116 0.0886 <b>el</b>
	MIMG/KG ARSENIC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution 95% UTL with 90% Coverage	102.6  General 100 1.524  1.9 43.6 42.6 4.3 7.85 16.3 11.03 8.957 0.812 1.514  Backgroun  0.16 0.0886	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  dd Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage	0.642 3.775 3.752 1.458 2.06 2.791 2.096 0.792 0.116 0.0886 el

	y y c D 1		o s 1 1 5	
-	99% Percentile (z)	21 07	99% Percentile (z)	F1 27
	93 % r ercentile (2)	31.07	99 % r ercentile (2)	31.37
	Gamma Distribution Test		Data Distribution Test	
	k star	1.743	Data do not follow a Discernable Distribution (	0.05)
	Theta Star	6.329	,	
	MLE of Mean	11.03		
	MLE of Standard Deviation	8.356		
. ,	nu star	348.6		
* 1				
	A-D Test Statistic		Nonparametric Statistics	ı
· ·	5% A-D Critical Value	-	90% Percentile	_
* 1	K-S Test Statistic		95% Percentile	_
	5% K-S Critical Value		99% Percentile	42.61
	Data not Gamma Distributed at 5% Significance	Level		
	Assuming Gamma Distribution		95% UTL with 90% Coverage	24.6
	90% Percentile	22 17	95% Percentile Bootstrap UTL with 90% Coverage	
. ,	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	24.64
	99% Percentile		95% UPL	
	5575 T 57601tile	, , , , ,	95% Chebyshev UPL	
	95% WH Approx. Gamma UPL	27.31	Upper Threshold Limit Based upon IQR	
	95% HW Approx. Gamma UPL	27.84		
* 1	95% WH Approx. Gamma UTL with 90% Coverage			
	95% HW Approx. Gamma UTL with 90% Coverage	25.5		
• •				
, ,	MINAO (KOLA DOENHOL (co. co.)			
	M MG/KG ARSENIC  (so_ss)			
		Conorol	Statistics	
	Total Number of Observations		Number of Distinct Observations	83
	Tolerance Factor	_	Number of Distinct Observations	00
1 1	Total and Tudes	1.000		
	Raw Statistics		Log-Transformed Statistics	
	Minimum	0.83	Minimum	-0.186
1 0	Minimum Maximum		Minimum Maximum	
3 0	Maximum Second Largest	71.7 23.5	Maximum Second Largest	4.272 3.157
3 0	Maximum Second Largest First Quartile	71.7 23.5 3	Maximum Second Largest First Quartile	4.272 3.157 1.099
2 1 2 2 2	Maximum Second Largest First Quartile Median	71.7 23.5 3 5.8	Maximum Second Largest First Quartile Median	4.272 3.157 1.099 1.758
3 9 3 1 3 3 3 1	Maximum Second Largest First Quartile Median Third Quartile	71.7 23.5 3 5.8 9.45	Maximum Second Largest First Quartile Median Third Quartile	4.272 3.157 1.099 1.758 2.246
3 1 3 3 3 3 4 3 4 4 4 4 4 4 4 4 4 4 4 4	Maximum Second Largest First Quartile Median Third Quartile Mean	71.7 23.5 3 5.8 9.45 7.172	Maximum Second Largest First Quartile Median Third Quartile Mean	4.272 3.157 1.099 1.758 2.246 1.629
2 2 2 2 2 2 4 2 4 4 4 4 4 4 4 4 4 4 4 4	Maximum Second Largest First Quartile Median Third Quartile Mean SD	71.7 23.5 3 5.8 9.45 7.172 7.679	Maximum Second Largest First Quartile Median Third Quartile Mean	4.272 3.157 1.099 1.758 2.246
3 0 1 3 3 3 3 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071	Maximum Second Largest First Quartile Median Third Quartile Mean	4.272 3.157 1.099 1.758 2.246 1.629
3 0 1 3 1 3 2 3 4 3 4 3 4 4 3 4 4 4 4 4 4 4 4 4 4	Maximum Second Largest First Quartile Median Third Quartile Mean SD	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071	Maximum Second Largest First Quartile Median Third Quartile Mean	4.272 3.157 1.099 1.758 2.246 1.629
2	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491	Maximum Second Largest First Quartile Median Third Quartile Mean SD	4.272 3.157 1.099 1.758 2.246 1.629
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491	Maximum Second Largest First Quartile Median Third Quartile Mean	4.272 3.157 1.099 1.758 2.246 1.629
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491	Maximum Second Largest First Quartile Median Third Quartile Mean SD	4.272 3.157 1.099 1.758 2.246 1.629 0.847
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics Lilliefors Test Statistic Lilliefors Critical Value	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0836
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491 Backgrour	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics Lognormal Distribution Test Lilliefors Test Statistic	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0836
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491 Backgrour	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0836
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491 Backgrour	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0826 el
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution  95% UTL with 90% Coverage	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491 Backgrour 0.204 0.0826	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0826 el
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t)	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491 Backgrour 0.204 0.0826	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t)	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0826 el
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t)	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491  Backgrour  0.204 0.0826  18.74 19.96 17.01	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0826 el
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491  Backgroun  0.204 0.0826  18.74 19.96 17.01 19.8	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0826 el 18.24 20.88 15.09 20.52
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t)	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491  Backgroun  0.204 0.0826  18.74 19.96 17.01 19.8	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0826 el 18.24 20.88 15.09 20.52
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491  Backgroun  0.204 0.0826  18.74 19.96 17.01 19.8	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0826 el 18.24 20.88 15.09 20.52
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491  Backgroun  0.204 0.0826  18.74 19.96 17.01 19.8 25.04	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	0.0836 0.0826 el
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Gamma Distribution Test k star	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491  Backgroun  0.204 0.0826  18.74 19.96 17.01 19.8 25.04	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0826 el 18.24 20.88 15.09 20.52 36.53
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491  Backgroun  0.204 0.0826  18.74 19.96 17.01 19.8 25.04	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0826 el 18.24 20.88 15.09 20.52 36.53
	Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Gamma Distribution Test k star Theta Star	71.7 23.5 3 5.8 9.45 7.172 7.679 1.071 5.491  Backgroun  0.204 0.0826  18.74 19.96 17.01 19.8 25.04  1.575 4.553 7.172	Maximum Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	4.272 3.157 1.099 1.758 2.246 1.629 0.847 0.0836 0.0826 el 18.24 20.88 15.09 20.52 36.53

	Y 0 0 1			
	A-D Test Statistic	0.587	Nonparametric Statistics	
	5% A-D Critical Value		90% Percentile	12.96
	K-S Test Statistic		95% Percentile	
	5% K-S Critical Value		99% Percentile	
	Data appear Gamma Distributed at 5% Significant			
	Assuming Gamma Distribution		95% UTL with 90% Coverage	14.5
8 3	90% Percentile	14.77	95% Percentile Bootstrap UTL with 90% Coverage	14.5
	95% Percentile	18.38	95% BCA Bootstrap UTL with 90% Coverage	14.5
	99% Percentile	26.51	95% UPL	
			95% Chebyshev UPL	
* '	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	19.13
* 1	95% HW Approx. Gamma UPL			
	95% WH Approx. Gamma UTL with 90% Coverage			
9	95% HW Approx. Gamma UTL with 90% Coverage	16.66		
* 3				
	ALMO (IZOLD A DIL INAL (I )			
M	M MG/KG BARIUM  (br_na)			
2 0		Conorol	Statistics	
3 1	Total Number of Observations		Number of Distinct Observations	27
1 7	Tolerance Factor		Number of Distinct Observations	21
1 1	Tolerance Factor	1.777		
3 4	Raw Statistics		Log-Transformed Statistics	
3 1	Minimum	0.96	Minimum	-0 0408
3 4	Maximum		Maximum	
3 3	Second Largest		Second Largest	
1 1	First Quartile		First Quartile	
1 *	Median		Median	
	Third Quartile		Third Quartile	
	Mean		Mean	
	SD	4.121	SD	0.759
	Coefficient of Variation	0.914		
	Skewness	2.224		
		Backgroun	d Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
-	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
	Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
	Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Lognormal	evel
4 2	A 1 N 150 1 1 1			
* 1	Assuming Normal Distribution	11.00	Assuming Lognormal Distribution	10.00
	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	95% UPL (t) 90% Percentile (z)		95% UPL (t) 90% Percentile (z)	
	90% Percentile (z) 95% Percentile (z)		90% Percentile (z) 95% Percentile (z)	
* 1	95% Percentile (z) 99% Percentile (z)		95% Percentile (z) 99% Percentile (z)	
	99% reicentile (2)	17.1	99% Percentile (2)	13.40
	Gamma Distribution Test		Data Distribution Test	
	k star	1 641	Data appear Lognormal at 5% Significance Lognormal	evel
	Theta Star		Data appear Logitorina at 0 % Orginicance Li	701
	MLE of Mean			
	MLE of Standard Deviation			
	nu star			
	nu stai	20.17		
	A-D Test Statistic	1.04	Nonparametric Statistics	<u> </u>
* 1	5% A-D Critical Value		90% Percentile	8.92
	K-S Test Statistic		95% Percentile	
			99% Percentile	
	5% K-S Critical Value	0.162	99% Percennie	
	5% K-S Critical Value  Data not Gamma Distributed at 5% Significance		99% Percentile	17.01
	5% K-S Critical Value  Data not Gamma Distributed at 5% Significance		99% Percentile	17.01

#### Table 2 ProUCL Output

	Y 8 C D 1	h.	0 E 1 1 E	
	90% Percentile	0.100	OFO/ Developing Deviation UTI with OOO/ Occurred	12.00
			95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage 95% UPL	
	99% Percentile	10.35		
* * 3	000/ 10/11 A margary 0 a margary 11D1	11 50	95% Chebyshev UPL	
	95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	12.56
	95% WH Approx. Gamma UTL with 90% Coverage			
	95% HW Approx. Gamma UTL with 90% Coverage	12.03		
1 1 1				
	M MG/KG BARIUM  (so_sb)			
* 1 *				
	T. IN 1 (0)		Statistics	00
	Total Number of Observations		Number of Distinct Observations	83
	Tolerance Factor	1.524		
	Raw Statistics		Law Transformed Chatistics	
	11011 0101101	10.0	Log-Transformed Statistics	0.01
v 1 1	Minimum		Minimum	
	Maximum		Maximum	
	Second Largest		Second Largest	
	First Quartile		First Quartile	
	Median		Median	
	Third Quartile		Third Quartile	
	Mean		Mean	
		6.047	SD	0.233
	Coefficient of Variation			
	Skewness	0.64		
			10. 4.4	
		Backgrour	nd Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
	Lilliefors Test Statistic		Lilliefors Test Statistic	
	Lilliefors Critical Value			
			Lilliefors Critical Value	
	Data not Normal at 5% Significance Leve		Data appear Lognormal at 5% Significance Lognormal	
e 4 4 e 4 5	Data not Normal at 5% Significance Leve		Data appear Lognormal at 5% Significance Lo	
x 1 2 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x 1 x	Data not Normal at 5% Significance Leve  Assuming Normal Distribution	İ	Data appear Lognormal at 5% Significance Lognormal Distribution	evel
	Data not Normal at 5% Significance Leve  Assuming Normal Distribution  95% UTL with 90% Coverage	34.91	Data appear Lognormal at 5% Significance Lognormal Distribution  95% UTL with 90% Coverage	35.67
x	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t)	34.91 35.79	Data appear Lognormal at 5% Significance Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t)	35.67 36.89
1 1 2 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	34.91 35.79 33.45	Data appear Lognormal at 5% Significance Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	35.67 36.89 33.71
1 1 2 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	34.91 35.79 33.45 35.64	Assuming Lognormal at 5% Significance Lognormal Distribution  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	35.67 36.89 33.71 36.69
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	34.91 35.79 33.45 35.64	Data appear Lognormal at 5% Significance Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	35.67 36.89 33.71 36.69
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	34.91 35.79 33.45 35.64	Data appear Lognormal at 5% Significance Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	35.67 36.89 33.71 36.69
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 64 Gamma Distribution Test 65 k star	34.91 35.79 33.45 35.64 39.77	Assuming Lognormal at 5% Significance Lognormal Distribution  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	35.67 36.89 33.71 36.69 43
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 4 Star Theta Star	34.91 35.79 33.45 35.64 39.77	Data appear Lognormal at 5% Significance Legal Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	35.67 36.89 33.71 36.69 43
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 4 Star Theta Star MLE of Mean	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7	Data appear Lognormal at 5% Significance Legal Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	35.67 36.89 33.71 36.69 43
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 4 Star Theta Star	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7	Data appear Lognormal at 5% Significance Legal Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	35.67 36.89 33.71 36.69 43
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 4 Star Theta Star MLE of Mean	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014	Data appear Lognormal at 5% Significance Legal Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	35.67 36.89 33.71 36.69 43
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 4 Star  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance	35.67 36.89 33.71 36.69 43
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant	35.67 36.89 33.71 36.69 43
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile	35.67 36.89 33.71 36.69 43
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile 95% Percentile	35.67 36.89 33.71 36.69 43 ce Level
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691 0.0893	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile	35.67 36.89 33.71 36.69 43 ce Level
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691 0.0893	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile 95% Percentile	35.67 36.89 33.71 36.69 43 ce Level
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691 0.0893	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile	35.67 36.89 33.71 36.69 43 ce Level 33.91 37.56 41.22
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691 0.0893 ce Level	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile	35.67 36.89 33.71 36.69 43 <b>ce Level</b> 33.91 37.56 41.22
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691 0.0893 ce Level	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile	35.67 36.89 33.71 36.69 43 <b>ce Level</b> 33.91 37.56 41.22
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile 95% Percentile	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691 0.0893 <b>ce Level</b>	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage	35.67 36.89 33.71 36.69 43 <b>ce Level</b> 33.91 37.56 41.22
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691 0.0893 <b>ce Level</b>	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile 95% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile	35.67 36.89 33.71 36.69 43 33.91 37.56 41.22 36.6 36.69 36.69 38.64
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile 95% Percentile	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691 0.0893 ce Level	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	35.67 36.89 33.71 36.69 43 <b>ce Level</b> 33.91 37.56 41.22 36.6 36.69 36.69 38.64 52.19
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile 95% Percentile	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691 0.0893 <b>ce Level</b> 33.64 36.32 41.71	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile 95% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile	35.67 36.89 33.71 36.69 43 <b>ce Level</b> 33.91 37.56 41.22 36.6 36.69 36.69 38.64 52.19
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691 0.0893 <b>ce Level</b> 33.64 36.32 41.71	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	35.67 36.89 33.71 36.69 43 <b>ce Level</b> 33.91 37.56 41.22 36.69 36.69 36.69 38.64 52.19
	Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile 95% Percentile	34.91 35.79 33.45 35.64 39.77 18.26 1.408 25.7 6.014 3651 0.308 0.75 0.0691 0.0893 ce Level 33.64 36.32 41.71 36.39 36.5 35.31	Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	35.67 36.89 33.71 36.69 43 <b>ce Level</b> 33.91 37.56 41.22 36.69 36.69 36.69 38.64 52.19

	· · · · · · · · · · · · · · · · · · ·				
à					
	  M MG/KG BARIUM  (so_ss)				
	MINIG/RGIDARIONI (SU_SS)				
,		General	Statistics		
1	Total Number of Observations		Number of Distinct Observations	100	
•	Tolerance Factor	1.506			
¥			1		
ŧ	Raw Statistics		Log-Transformed Statistics		
à	Minimum	6.3	Minimum	1.841	
*	Maximum	-	Maximum		
•	Second Largest		Second Largest		
	First Quartile		First Quartile		
	Median	-	Median		
1	Third Quartile		Third Quartile		
,	Mean		Mean		
,	-	12.92	SD	0.556	
*	Coefficient of Variation Skewness				
à	Skewiiess	0.130			
		Backgroui	nd Statistics		
	Normal Distribution Test	Dackgrou	Lognormal Distribution Test		
	Lilliefors Test Statistic	0.0483	Lilliefors Test Statistic	0.132	
	Lilliefors Critical Value	0.0826	Lilliefors Critical Value		
1	Data appear Normal at 5% Significance Lev		Data not Lognormal at 5% Significance Lev	el	
1			· ·		
,	Assuming Normal Distribution		Assuming Lognormal Distribution		
¥	95% UTL with 90% Coverage		95% UTL with 90% Coverage		
*	95% UPL (t)	50.96	95% UPL (t)		
2	90% Percentile (z)		90% Percentile (z)		
*	95% Percentile (z)		95% Percentile (z)		
•	99% Percentile (z)	59.5	99% Percentile (z)	94.54	
			B . B		
,	Gamma Distribution Test k star	1.004	Data Distribution Test  Data appear Normal at 5% Significance Level		
,	Theta Star		Data appear Normal at 5% Significance Lev	eı	
,	MLE of Mean				
r	MLE of Standard Deviation				
*	nu star				
à					
r	A-D Test Statistic	1.743	Nonparametric Statistics		
	5% A-D Critical Value		90% Percentile	47.14	
	K-S Test Statistic		95% Percentile		
	5% K-S Critical Value		99% Percentile	59.86	
, _	Data not Gamma Distributed at 5% Significance	Level			
1				4.5.	
	Assuming Gamma Distribution	10.1	95% UTL with 90% Coverage		
*	90% Percentile	-	95% Percentile Bootstrap UTL with 90% Coverage		
à	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage		
*	99% Percentile	13.76	95% UPL		
	OEO/ WILL Amazay, Common LIDI	57 °	95% Chebyshev UPL		
	95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	υ3. I	
	95% WH Approx. Gamma UTL with 90% Coverage				
,	95% HW Approx. Gamma UTL with 90% Coverage				
_					
•	M MG/KG BERYLLIUM  (br_na)				
à					
		General	Statistics		
	Total Number of Observations Tolerance Factor		Number of Distinct Observations	30	

		h		r
	Raw Statistics		Log-Transformed Statistics	
	Minimum	0.065	Minimum -2.733	
	Maximum		Maximum	
	Second Largest		Second Largest	
	First Quartile		First Quartile	
4 7	Median	0.443	Median	-0.814
	Third Quartile	0.613	Third Quartile	-0.49
	Mean			-1.149
		0.242	SD	0.793
	Coefficient of Variation			
	Skewness	0.0321		
		Poekarour	d Statistics	
	Normal Distribution Test	Баскугоиг	Lognormal Distribution Test	
	Shapiro Wilk Test Statistic	0.921	Shapiro Wilk Test Statistic	0.882
1 3	Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
	Data not Normal at 5% Significance Leve		Data not Lognormal at 5% Significance Lev	
	Assuming Normal Distribution		Assuming Lognormal Distribution	
1	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
. ,	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
* 1	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)	0.968	99% Percentile (z)	2.008
* 3	Gamma Distribution Test		Data Distribution Test	
	k star	1 976	Data do not follow a Discernable Distribution (	0.05)
	Theta Star		Data de Net Ienew a Discernadio Distribution (	0.00,
	MLE of Mean			
3 1	MLE of Standard Deviation	0.289		
. ,	nu star	118.5		
3 7				
3 1	A-D Test Statistic		Nonparametric Statistics	
	5% A-D Critical Value		90% Percentile	
	K-S Test Statistic		95% Percentile	
3 X	5% K-S Critical Value  Data not Gamma Distributed at 5% Significance		99% Percentile	0.834
1 *	Data not Gamma Distributed at 5% Significance	Levei		
	Assuming Gamma Distribution		95% UTL with 90% Coverage	0.75
	90% Percentile	0.792	95% Percentile Bootstrap UTL with 90% Coverage	
. ,	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
	99% Percentile	1.355	95% UPL	
			95% Chebyshev UPL	
	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	1.287
	95% HW Approx. Gamma UPL			
	95% WH Approx. Gamma UTL with 90% Coverage			
	95% HW Approx. Gamma UTL with 90% Coverage	1.067		
• •	M MG/KG BERYLLIUM  (so_sb)			
•				
			Statistics	
	Total Number of Observations		Number of Distinct Observations	46
* ¥	<del> </del>	1.524		
* *	Tolerance Factor			
• •				
* 1	Raw Statistics	0.20	Log-Transformed Statistics	1 070
	Raw Statistics Minimum		Minimum	
	Raw Statistics Minimum Maximum	0.78	Minimum Maximum	-0.248
	Raw Statistics  Minimum  Maximum  Second Largest	0.78 0.76	Minimum Maximum Second Largest	-0.248 -0.274
	Raw Statistics Minimum Maximum	0.78 0.76 0.384	Minimum Maximum	-0.248 -0.274 -0.958

	Y F C D 1			
	Mana	0.400	Man	0.700
		0.466		-0.788
* 1		0.105	SD	0.225
	Coefficient of Variation			
	Skewness	0.537		
		Backgrour	nd Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
	Lilliefors Test Statistic	0.0553	Lilliefors Test Statistic	0.0552
	Lilliefors Critical Value	0.0886	Lilliefors Critical Value	0.0886
	Data appear Normal at 5% Significance Lev	/el	Data appear Lognormal at 5% Significance Lognormal	evel
			,	
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	95% UTL with 90% Coverage	0.627	95% UTL with 90% Coverage	0.641
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
, ,	99% Percentile (z)		99% Percentile (z)	
,	99% Percentile (2)	0.711	99% Percentile (2)	0.767
,	D:		D . D' . '' . T .	
	Gamma Distribution Test	40.0	Data Distribution Test	
,	k star		Data appear Normal at 5% Significance Lev	rei
_	Theta Star			1
	MLE of Mean			
, ,	MLE of Standard Deviation			
	nu star	3919		
•				
•	A-D Test Statistic	0.202	Nonparametric Statistics	
,	5% A-D Critical Value	0.75	90% Percentile	0.6
,	K-S Test Statistic	0.0491	95% Percentile	0.646
	5% K-S Critical Value	0.0892	99% Percentile	0.76
	Data appear Gamma Distributed at 5% Significan	ce Level		
	Assuming Gamma Distribution		95% UTL with 90% Coverage	0.64
	90% Percentile	0.605	95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
1 +	99% Percentile		95% UPL	
	55761 Crecitue	0.740	95% Chebyshev UPL	
	95% WH Approx. Gamma UPL	0.653	Upper Threshold Limit Based upon IQR	
. ,	95% HW Approx. Gamma UPL		Opper Threshold Limit based upon IQN	0.730
	95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage			
	95% HW Approx. Gariina OTL with 90% Coverage	0.030		
,				
	M MG/KG BERYLLIUM  (so_ss)			
_				
			Statistics	
	+			
1	Number of Valid Data		Number of Detected Data	
,	Number of Distinct Detected Data	39	Number of Non-Detect Data	38
1		39		38
1	Number of Distinct Detected Data	39	Number of Non-Detect Data Percent Non-Detects	38
1	Number of Distinct Detected Data Tolerance Factor  Raw Statistics	39 1.506	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics	38 33.04%
*	Number of Distinct Detected Data Tolerance Factor	39 1.506	Number of Non-Detect Data Percent Non-Detects	38 33.04%
7 T	Number of Distinct Detected Data Tolerance Factor  Raw Statistics	39 1.506	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics	38 33.04% -2.12
7 Y	Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected	39 1.506 0.12 0.79	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected	38 33.04% -2.12 -0.236
1 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected	39 1.506 0.12 0.79 0.383	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected  Maximum Detected	38 33.04% -2.12 -0.236 -1.057
7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected  Maximum Detected  Mean of Detected	39 1.506 0.12 0.79 0.383 0.154	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected  Maximum Detected  Mean of Detected  SD of Detected	-2.12 -0.236 -1.057 0.474
1 T	Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	0.12 0.79 0.383 0.154 0.57	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected  Maximum Detected  Mean of Detected  SD of Detected  Minimum Non-Detect	-2.12 -0.236 -1.057 0.474 -0.562
1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected	0.12 0.79 0.383 0.154 0.57	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected  Maximum Detected  Mean of Detected  SD of Detected	-2.12 -0.236 -1.057 0.474 -0.562
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect	0.12 0.79 0.383 0.154 0.57	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected  Maximum Detected  Mean of Detected  SD of Detected  Minimum Non-Detect  Maximum Non-Detect	-2.12 -0.236 -1.057 0.474 -0.562
1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1	Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect	0.12 0.79 0.383 0.154 0.57 0.815	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario	-2.12 -0.236 -1.057 0.474 -0.562 -0.205
* * * * * * * * * * * * * * * * * * *	Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is	0.12 0.79 0.383 0.154 0.57 0.815	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect	38 33.049 -2.12 -0.236 -1.057 0.474 -0.562 -0.205
* * * * * * * * * * * * * * * * * * * *	Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Use of KM Method is For all methods (except KM, DL/2, and ROS Methods)	0.12 0.79 0.383 0.154 0.57 0.815	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect	38 33.049 -2.12 -0.236 -1.057 0.474 -0.562 -0.205
	Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is	0.12 0.79 0.383 0.154 0.57 0.815	Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect	38 33.04% -2.12 -0.236 -1.057 0.474 -0.562 -0.205

	y 6 1		0 H 1 K	
T	Normal Distribution Test with Detected Values	Only	Lognormal Distribution Test with Detected Value	s On
Ī	Lilliefors Test Statistic	0.0982	Lilliefors Test Statistic	0.116
1	5% Lilliefors Critical Value	0.101	5% Lilliefors Critical Value	0.101
	Data appear Normal at 5% Significance Lev	/el	Data not Lognormal at 5% Significance Lev	el
1				
1	Assuming Normal Distribution		Assuming Lognormal Distribution	
┙	DL/2 Substitution Method		DL/2 Substitution Method	
	Mean		Mean (Log Scale)	
	SD	0.129	SD (Log Scale)	
	95% UTL 90% Coverage	0.562	95% UTL 90% Coverage	0.619
	95% UPL (t)	0.583	95% UPL (t)	0.659
	90% Percentile (z)	0.533	90% Percentile (z)	0.567
	95% Percentile (z)	0.58	95% Percentile (z)	0.654
]	99% Percentile (z)	0.668	99% Percentile (z)	0.853
+	Maying up Likelihaad Fatimata (MLF) Mathad	NI/A	Law DOC Mathad	
+	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	0 07:
+			Mean in Original Scale	
+			SD in Original Scale	
4			Mean in Log Scale	
4			SD in Log Scale	
1			95% UTL 90% Coverage	
1			95% UPL (t)	
			90% Percentile (z)	
╽			95% Percentile (z)	
-			99% Percentile (z)	0.887
╁	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values 0	Only
Ť	k star (bias corrected)		Data appear Normal at 5% Significance Leve	
Ť	Theta Star	0.0755		
T	nu star	781.1		
	A-D Test Statistic		Nonparametric Statistics	
	5% A-D Critical Value		Kaplan-Meier (KM) Method	
	K-S Test Statistic		Mean	
	5% K-S Critical Value		SD	0.151
	Data not Gamma Distributed at 5% Significance	Level	SE of Mean	
1			95% KM UTL with 90% Coverage	
	Assuming Gamma Distribution		95% KM Chebyshev UPL	1.041
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	0.632
T	Mean	0.39	90% Percentile (z)	0.574
	Median	0.404	95% Percentile (z)	0.628
	SD	0.133	99% Percentile (z)	0.731
Ť		6.905	, ,	
1	Theta star		Gamma ROS Limits with Extrapolated Data	а
1	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	
t	95% Percentile of Chisquare (2k)		95% Hawkins Wixley (HW) Approx. Gamma UPL	
1			95% WH Approx. Gamma UTL with 90% Coverage	
†	90% Percentile	0.588	95% HW Approx. Gamma UTL with 90% Coverage	
†	95% Percentile		TELLINIA PRIORI GENERAL GILL HINI GOVO GOVOIAGO	3.300
T	99% Percentile			
	Note: DL/2 is not a recommended method.			
+	Note. DL/2 is not a recommended method.			
N	M MG/KG CADMIUM  (br_na)			
+		Genera	l Statistics	
t	Number of Valid Data		Number of Detected Data	0
1	Number of Distinct Detected Data	0	Number of Non-Detect Data	30
╀				
+	Warning: All observations are Non-Detects	(NDs), th	erefore all statistics and estimates should also be ND	s!
			erefore all statistics and estimates should also be ND tistics are also NDs lying below the largest detection I	

	Y F C D 1	ь	0 8 1 1 E	r
	The data set for variable M	IMG/KGIC	ADMIUM  (br_na) was not processed!	
	The data set for variable in	pwa/kajo	ADMICINI (bi_lia) was not processed:	
	M MG/KG CADMIUM  (so_sb)			
*		General	Statistics	
	Number of Valid Data		Number of Detected Data	18
	Number of Distinct Detected Data	13	Number of Non-Detect Data	82
* * ;	Tolerance Factor	1.524	Percent Non-Detects	82.00%
* * 1				
	Raw Statistics		Log-transformed Statistics	
	Minimum Detected	0.067	Minimum Detected	-2.703
* * *	Maximum Detected	0.25	Maximum Detected	-1.386
* 1 7	Mean of Detected	0.153	Mean of Detected	-1.942
	SD of Detected		SD of Detected	
* * *	Minimum Non-Detect		Minimum Non-Detect	
* + +	Maximum Non-Detect		Maximum Non-Detect	
	Maximum Non-Detect	0.23	Waxiiiuiii Noii-Detect	-1.47
* * *	Data with Manhinta Data at and inches		Ole ele Data stien Linet Occupado	
	Data with Multiple Detection Limits		Single Detection Limit Scenario	0.7
	Note: Data have multiple DLs - Use of KM Method is		Number treated as Non-Detect with Single DL	
	For all methods (except KM, DL/2, and ROS Methods	5),	Number treated as Detected with Single DL	
	Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	97.00%
* + 3			d Statistics	
* + *	Normal Distribution Test with Detected Values	Only	Lognormal Distribution Test with Detected Value	es Only
* 1 *	Shapiro Wilk Test Statistic	0.953	Shapiro Wilk Test Statistic	0.947
x + 0	5% Shapiro Wilk Critical Value	0.897	5% Shapiro Wilk Critical Value	0.897
* * '	Data appear Normal at 5% Significance Lev		Data appear Lognormal at 5% Significance Lognormal	
* * >			11 0	
* * :	Assuming Normal Distribution		Assuming Lognormal Distribution	
	DL/2 Substitution Method		DL/2 Substitution Method	
* * *		0.0641	Mean (Log Scale)	-2 985
* * *		0.0516	SD (Log Scale)	
x + 1	95% UTL 90% Coverage		95% UTL 90% Coverage	
x < x	95% UPL (t)		95% UPL (t)	
X 3 0	90% Percentile (z)		90% Percentile (z)	
W 3 1	95% Percentile (z)		95% Percentile (z)	
* 1 7	99% Percentile (z)	0.184	99% Percentile (z)	0.23
	Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
	Mean		Mean in Original Scale	
* , *		0.0294	SD in Original Scale	
* 1 *	95% UTL with 90% Coverage	0.225	95% UTL with 90% Coverage	
* 1 1			95% BCA UTL with 90% Coverage	
X 3 X			95% Bootstrap (%) UTL with 90% Coverage	
x 1 +	95% UPL (t)	0.229	95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)		99% Percentile (z)	
	3373 : 3.337,4110 (2)	1	3373. 3.3374110 (2)	1
	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values (	)nlv
	k star (bias corrected)		Data appear Normal at 5% Significance Levi	
	Theta Star		Data appear Normal at 0 /0 Olymineance Levi	<u> </u>
* * 1	nu star			
	iiu star	200.0		
	ABTURGUE	0.202	Namananatal - Otal-sta	
	A-D Test Statistic		Nonparametric Statistics	
	5% A-D Critical Value		Kaplan-Meier (KM) Method	
	K-S Test Statistic			0.0837
	5% K-S Critical Value			0.0405
* * 1	Data appear Gamma Distributed at 5% Significan	ce Level	SE of Mean	0.00427
			95% KM UTL with 90% Coverage	0.145
	Assuming Gamma Distribution		95% KM Chebyshev UPL	0.261
* * *	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
			21 – (4)	

	7 T C D I			
* * 1	Mean	0.0287	90% Percentile (z)	0.136
	Median		95% Percentile (z)	
		0.0633	99% Percentile (z)	
		0.0033	99% Percentile (2)	0.176
			Commo DOC Limite with Entropolated Date	
	Theta star Nu star		Gamma ROS Limits with Extrapolated Data	
			95% Wilson Hilferty (WH) Approx. Gamma UPL	0.0935
	95% Percentile of Chisquare (2k)	1.236	95% Hawkins Wixley (HW) Approx. Gamma UPL	
	000/ P	0.0704	95% WH Approx. Gamma UTL with 90% Coverage	
	90% Percentile		95% HW Approx. Gamma UTL with 90% Coverage	0.064
	95% Percentile			
	99% Percentile	0.441		
	Note: DL/2 is not a recommended method.			
	MIMG/KGICADMIUMI (so_ss)			
			Statistics	
	Number of Valid Data		Number of Detected Data	-
	Number of Distinct Detected Data		Number of Non-Detect Data	
* 1 1	Tolerance Factor	1.506	Percent Non-Detects	92.17%
	Raw Statistics		Log-transformed Statistics	
	Minimum Detected	0.068	Minimum Detected	-2.688
	Maximum Detected	0.53	Maximum Detected	-0.635
	Mean of Detected	0.147	Mean of Detected	-2.155
* 1 1	SD of Detected	0.146	SD of Detected	0.633
	Minimum Non-Detect	0.049	Minimum Non-Detect	-3.016
	Maximum Non-Detect	0.815	Maximum Non-Detect	-0.205
* 1 1	Data with Multiple Detection Limits		Single Detection Limit Scenario	
	Note: Data have multiple DLs - Use of KM Method is	recommen		115
	For all methods (except KM, DL/2, and ROS Methods		Number treated as Detected with Single DL	
	Observations < Largest ND are treated as NDs	- / 1	Single DL Non-Detect Percentage	
	<u> </u>		5	
* 1 1	Warning: There	are only 9	Detected Values in this data	
			bootstrap may be performed on this data set	
* 1 1			e reliable enough to draw conclusions	
* 1 *	,			
* 1 1	It is recommended to have 10-15 or mo	ore distinct	observations for accurate and meaningful results.	
* 1 *			-	
		Backgrour	nd Statistics	
	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	s Only
	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
	5% Shapiro Wilk Critical Value		5% Shapiro Wilk Critical Value	
	Data not Normal at 5% Significance Leve		Data not Lognormal at 5% Significance Lev	
	A council a Normal Distribution		Assuming Lognormal Distribution	
	l Assuming Normal Distribution			
	Assuming Normal Distribution  DL/2 Substitution Method			
* * *	DL/2 Substitution Method		DL/2 Substitution Method	-2 477
* * *	DL/2 Substitution Method Mean	0.151	DL/2 Substitution Method Mean (Log Scale)	
	DL/2 Substitution Method Mean SD	0.151 0.148	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)	1.111
	DL/2 Substitution Method Mean SD 95% UTL 90% Coverage	0.151 0.148 0.373	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage	1.111 0.448
	DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)	0.151 0.148 0.373 0.397	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)	1.111 0.448 0.534
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	0.151 0.148 0.373 0.397 0.34	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	1.111 0.448 0.534 0.349
	DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	0.151 0.148 0.373 0.397 0.34 0.394	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	1.111 0.448 0.534 0.349 0.522
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	0.151 0.148 0.373 0.397 0.34 0.394	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	1.111 0.448 0.534 0.349 0.522
	DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	0.151 0.148 0.373 0.397 0.34 0.394 0.495	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	1.111 0.448 0.534 0.349 0.522
	DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	0.151 0.148 0.373 0.397 0.34 0.394 0.495	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method	1.111 0.448 0.534 0.349 0.522 1.113
	DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	0.151 0.148 0.373 0.397 0.34 0.394 0.495	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale	1.111 0.448 0.534 0.349 0.522 1.113
	DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	0.151 0.148 0.373 0.397 0.34 0.394 0.495	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale	1.111 0.448 0.534 0.349 0.522 1.113 0.0232 0.0538
	DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	0.151 0.148 0.373 0.397 0.34 0.394 0.495	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale	1.111 0.448 0.534 0.349 0.522 1.113 0.0232 0.0538
	DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	0.151 0.148 0.373 0.397 0.34 0.394 0.495	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale	1.111 0.448 0.534 0.349 0.522 1.113 0.0232 0.0538 -4.38
	DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	0.151 0.148 0.373 0.397 0.34 0.394 0.495	DL/2 Substitution Method  Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Log ROS Method Mean in Original Scale SD in Original Scale Mean in Log Scale	1.111 0.448 0.534 0.349 0.522 1.113 0.0232 0.0538 -4.38 0.913

_	у у с р 1		G H I I K	
-			95% UPL (t)	0.0573
,			90% Percentile (z)	
2			95% Percentile (z)	0.0404
-			99% Percentile (z)	
			99% Percentile (2)	0.103
	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values C	nlv
	k star (bias corrected)		Data do not follow a Discernable Distribution (0	
	Theta Star		24.4 40 1101 1011011 4 210001114210 2101112411011 (0	,
	nu star			
	A-D Test Statistic	1.172	Nonparametric Statistics	
	5% A-D Critical Value	0.729	Kaplan-Meier (KM) Method	
	K-S Test Statistic		Mean	0.0778
	5% K-S Critical Value	0.282	SD	0.0543
	Data not Gamma Distributed at 5% Significance		SE of Mean	0.0066
			95% KM UTL with 90% Coverage	0.16
	Assuming Gamma Distribution		95% KM Chebyshev UPL	
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
	Mean	0.0116	90% Percentile (z)	0.147
7	Median		95% Percentile (z)	
Ţ	SD	0.0555	99% Percentile (z)	0.204
1	k star	0.101	, ,	
	Theta star	0.115	Gamma ROS Limits with Extrapolated Data	
	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	
'	95% Percentile of Chisquare (2k)	1.167	95% Hawkins Wixley (HW) Approx. Gamma UPL	0.0124
'			95% WH Approx. Gamma UTL with 90% Coverage	0.0165
	90% Percentile	0.0309	95% HW Approx. Gamma UTL with 90% Coverage	0.0091
	95% Percentile	0.0671		
2	99% Percentile  Note: DL/2 is not a recommended method.  MIMG/KGICAL CILIMI (br. na)	0.183		
,		0.183		
	Note: DL/2 is not a recommended method.		Statistics	
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations	General	Statistics  Number of Distinct Observations	30
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)	General		30
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor	General	Number of Distinct Observations	30
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics	<b>General</b> 30 1.777	Number of Distinct Observations  Log-Transformed Statistics	
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum	<b>General</b> 30 1.777	Number of Distinct Observations  Log-Transformed Statistics  Minimum	4.284
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum	<b>General</b> 30 1.777 72.5 39500	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum	4.284 10.58
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest	General 30 1.777 72.5 39500 21300	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest	4.284 10.58 9.966
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile	General 30 1.777 72.5 39500 21300 1420	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile	4.284 10.58 9.966 7.258
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median	General 30 1.777  72.5 39500 21300 1420 2790	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median	4.284 10.58 9.966 7.258 7.93
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	General 30 1.777  72.5 39500 21300 1420 2790 5605	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile	4.284 10.58 9.966 7.258 7.93 8.631
	Note: DL/2 is not a recommended method.  MIMG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	General 30 1.777 72.5 39500 21300 1420 2790 5605 5612	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	4.284 10.58 9.966 7.258 7.93 8.631 7.924
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	General 30 1.777 72.5 39500 21300 1420 2790 5605 5612 7981	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	4.284 10.58 9.966 7.258 7.93 8.631
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation	General 30 1.777 72.5 39500 21300 1420 2790 5605 5612 7981 1.422	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	4.284 10.58 9.966 7.258 7.93 8.631 7.924
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	General 30 1.777 72.5 39500 21300 1420 2790 5605 5612 7981 1.422	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	4.284 10.58 9.966 7.258 7.93 8.631 7.924
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	General 30 1.777  72.5 39500 21300 1420 2790 5605 5612 7981 1.422 3.103	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	4.284 10.58 9.966 7.258 7.93 8.631 7.924
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	General 30 1.777  72.5 39500 21300 1420 2790 5605 5612 7981 1.422 3.103	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	4.284 10.58 9.966 7.258 7.93 8.631 7.924
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	General 30 1.777 72.5 39500 21300 1420 2790 5605 5612 7981 1.422 3.103 Backgrour	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	4.284 10.58 9.966 7.258 7.93 8.631 7.924 1.301
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	General 30 1.777  72.5 39500 21300 1420 2790 5605 5612 7981 1.422 3.103  Backgrour	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  dd Statistics  Lognormal Distribution Test	4.284 10.58 9.966 7.258 7.93 8.631 7.924 1.301
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic	General 30 1.777 72.5 39500 21300 1420 2790 5605 5612 7981 1.422 3.103  Backgrour  0.632 0.927	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  dd Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic	4.284 10.58 9.966 7.258 7.93 8.631 7.924 1.301
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	General 30 1.777 72.5 39500 21300 1420 2790 5605 5612 7981 1.422 3.103  Backgrour  0.632 0.927	Log-Transformed Statistics    Log-Transformed Statistics	4.284 10.58 9.966 7.258 7.93 8.631 7.924 1.301
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution	General 30 1.777  72.5 39500 21300 1420 2790 5605 5612 7981 1.422 3.103  Backgrour  0.632 0.927	Log-Transformed Statistics    Log-Transformed Statistics	4.284 10.58 9.966 7.258 7.93 8.631 7.924 1.301 0.975 0.927
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution 95% UTL with 90% Coverage	General 30 1.777  72.5 39500 21300 1420 2790 5605 5612 7981 1.422 3.103  Backgrour  0.632 0.927	Log-Transformed Statistics    Log-Transformed Statistics	4.284 10.58 9.966 7.258 7.93 8.631 7.924 1.301 0.975 0.927 evel
,	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t)	General 30 1.777  72.5 39500 21300 1420 2790 5605 5612 7981 1.422 3.103  Backgrour  0.632 0.927 I	Log-Transformed Statistics    Minimum   Maximum   Second Largest   First Quartile   Median   Third Quartile   Mean   SD	4.284 10.58 9.966 7.258 7.93 8.631 7.924 1.301 0.975 0.927 evel
	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t)	General 30 1.777  72.5 39500 21300 1420 2790 5605 5612 7981 1.422 3.103  Backgrour  0.632 0.927 I  19793 19396 15839	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Ad Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Let  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	4.284 10.58 9.966 7.258 7.93 8.631 7.924 1.301 0.975 0.927 evel 27876 26127 14631
2	Note: DL/2 is not a recommended method.  M MG/KG CALCIUM  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t)	General 30 1.777  72.5 39500 21300 1420 2790 5605 5612 7981 1.422 3.103  Backgrour  0.632 0.927 1 19793 19396 15839 18739	Log-Transformed Statistics    Minimum   Maximum   Second Largest   First Quartile   Median   Third Quartile   Mean   SD	4.284 10.58 9.966 7.258 7.93 8.631 7.924 1.301 0.975 0.927 evel 27876 26127 14631 23473

	у г с р		0 8 1 1	r
1 0 1 1	Gamma Distribution Test		Data Distribution Test	
	k star	0 772	Data appear Gamma Distributed at 5% Significant	ce Level
1 0 1 1	Theta Star	****		
1 0 1 1	MLE of Mean	_		
	MLE of Standard Deviation			
	nu star			
1 + 1 1	Tiu Stai	40.5		
1 0 1 1	A-D Test Statistic	0.533	Nonparametric Statistics	
1 0 1 1	5% A-D Critical Value		90% Percentile	10100
	K-S Test Statistic		95% Percentile	
	5% K-S Critical Value		99% Percentile	34222
	Data appear Gamma Distributed at 5% Significan	ce Levei		
	Accomplication		050/ LITI: h- 000/ 0	21200
	Assuming Gamma Distribution	10701	95% UTL with 90% Coverage	
	90% Percentile		95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile	_	95% BCA Bootstrap UTL with 90% Coverage	
	99% Percentile	29520	95% UPL	
	2727.1111.	1000 (	95% Chebyshev UPL	
	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	11883
	95% HW Approx. Gamma UPL			
	95% WH Approx. Gamma UTL with 90% Coverage			
	95% HW Approx. Gamma UTL with 90% Coverage	19681		
	M MG/KG CALCIUM  (so_sb)			
			Statistics	
	Total Number of Observations	100	Number of Distinct Observations	89
	Tolerance Factor	1.524		
	Raw Statistics		Log-Transformed Statistics	
	Minimum	324	Minimum	5.781
	Maximum	1870	Maximum	7.534
	Second Largest	1850	Second Largest	7.523
	First Quartile	605.8	First Quartile	6.406
	Median	830	Median	6.721
	Third Quartile	1273	Third Quartile	7.149
	Mean	952.6	Mean	6.758
		415.9		0.463
	Coefficient of Variation			
	Skewness			
		1		
		Backgrour	nd Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
	Lilliefors Test Statistic	0.145	Lilliefors Test Statistic	0.124
	Lilliefors Critical Value		Lilliefors Critical Value	-
	Data not Normal at 5% Significance Leve	1	Data not Lognormal at 5% Significance Lev	
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	95% UTL with 90% Coverage	1586	95% UTL with 90% Coverage	1743
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
* : *	99% Percentile (z)		99% Percentile (z)	
	33 % 1 Greentile (2)	.020	55 % 1 Greentile (2)	
	Gamma Distribution Test		Data Distribution Test	
	k star	A 961	Data Distribution Test  Data do not follow a Discernable Distribution (	0.05\
	Theta Star		Data do not follow a Discettiable Distribution (	u.uu,
	neta Star MLE of Mean			
	MLE of Mean  MLE of Standard Deviation			
	nu star	JJ∠. I		
	A-D Test Statistic	1.004	Nonparametric Statistics	

	y y t	,		
		0.754	200/ 5	4550
	5% A-D Critical Value		90% Percentile	
	K-S Test Statistic	-	95% Percentile	
	5% K-S Critical Value		99% Percentile	1850
,	Data not Gamma Distributed at 5% Significance	Level		
	Assuming Gamma Distribution		95% UTL with 90% Coverage	
	90% Percentile	1525	95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile	1747	95% BCA Bootstrap UTL with 90% Coverage	1651
1 0 4 3	99% Percentile	2217	95% UPL	1689
			95% Chebyshev UPL	2774
	95% WH Approx. Gamma UPL	1755	Upper Threshold Limit Based upon IQR	2273
	95% HW Approx. Gamma UPL			
	95% WH Approx. Gamma UTL with 90% Coverage			
1 1 0 1	95% HW Approx. Gamma UTL with 90% Coverage	1680		
1 1 1 1	, pp 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
	MIMG/KGICALCILIMI (so. ss)			
1 1 + 1	M MG/KG CALCIUM  (so_ss)			
		Comerci	Statistics	
	Number of Valid Data			75
		-	Number of Detected Data	-
	Number of Distinct Detected Data		Number of Non-Detect Data	
	Tolerance Factor	1.506	Percent Non-Detects	34./8%
	Raw Statistics		Log-transformed Statistics	
	Minimum Detected		Minimum Detected	
	Maximum Detected		Maximum Detected	
1 1 1 4	Mean of Detected	702.9	Mean of Detected	-
1 1 1 1	SD of Detected	723	SD of Detected	0.677
	Minimum Non-Detect	194	Minimum Non-Detect	5.268
	Maximum Non-Detect	1900	Maximum Non-Detect	7.55
1 1 1 0				
1 1 1 1	Data with Multiple Detection Limits	'	Single Detection Limit Scenario	1
1 1 1 1	Note: Data have multiple DLs - Use of KM Method is	recommen	Number treated as Non-Detect with Single DL	111
1 1 1 1	For all methods (except KM, DL/2, and ROS Methods		Number treated as Detected with Single DL	
1 1 1 1	Observations < Largest ND are treated as NDs	,,	Single DL Non-Detect Percentage	
1 1 1 1	<b>3</b>			
1 1 1 4		Backgroun	d Statistics	
1 1 1 1	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	s Only
	Lilliefors Test Statistic		Lilliefors Test Statistic	
	5% Lilliefors Critical Value		5% Lilliefors Critical Value	
	Data not Normal at 5% Significance Leve		Data not Lognormal at 5% Significance Lev	
	Data not Normal at 0% digimicance 25ve	•	Data not Enginerman at 0 % Digninicance Eev	0.
1 1 1 1				
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	Assuming Normal Distribution DL/2 Substitution Method		Assuming Lognormal Distribution  DI /2 Substitution Method	
	DL/2 Substitution Method		DL/2 Substitution Method	
	DL/2 Substitution Method Mean	585.2	DL/2 Substitution Method Mean (Log Scale)	6.084
1 1 1 1	DL/2 Substitution Method Mean SD	585.2 619.1	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)	6.084 0.695
1 1 1 1	DL/2 Substitution Method Mean SD 95% UTL 90% Coverage	585.2 619.1 1518	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage	6.084 0.695 1251
1 1 1 1	DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage 95% UPL (t)	585.2 619.1 1518 1616	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)	6.084 0.695 1251 1397
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	585.2 619.1 1518 1616 1379	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	6.084 0.695 1251 1397 1070
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	585.2 619.1 1518 1616 1379 1604	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	6.084 0.695 1251 1397 1070 1377
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	585.2 619.1 1518 1616 1379 1604	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	6.084 0.695 1251 1397 1070 1377
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	585.2 619.1 1518 1616 1379 1604 2025	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	6.084 0.695 1251 1397 1070 1377
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method	585.2 619.1 1518 1616 1379 1604 2025	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)	6.084 0.695 1251 1397 1070 1377 2212
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method Mean	585.2 619.1 1518 1616 1379 1604 2025	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale	6.084 0.695 1251 1397 1070 1377 2212 570.9
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method Mean SD	585.2 619.1 1518 1616 1379 1604 2025 -3903 3203	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  10	6.084 0.695 1251 1397 1070 1377 2212 570.9 612.1
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method Mean	585.2 619.1 1518 1616 1379 1604 2025 -3903 3203	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale	6.084 0.695 1251 1397 1070 1377 2212 570.9 612.1
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method Mean SD	585.2 619.1 1518 1616 1379 1604 2025 -3903 3203	DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  10	6.084 0.695 1251 1397 1070 1377 2212 570.9 612.1 1142
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method Mean SD	585.2 619.1 1518 1616 1379 1604 2025 -3903 3203	DL/2 Substitution Method  Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Log ROS Method Mean in Original Scale SD in Original Scale	6.084 0.695 1251 1397 1070 1377 2212 570.9 612.1 1142 1290
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method Mean SD	585.2 619.1 1518 1616 1379 1604 2025 -3903 3203 920.5	DL/2 Substitution Method  Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Log ROS Method Mean in Original Scale SD in Original Scale 95% UTL with 90% Coverage 95% BCA UTL with 90% Coverage	6.084 0.695 1251 1397 1070 1377 2212 570.9 612.1 1142 1290 1290
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method Mean SD 95% UTL with 90% Coverage	585.2 619.1 1518 1616 1379 1604 2025 -3903 3203 920.5	DL/2 Substitution Method  Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Log ROS Method Mean in Original Scale SD in Original Scale 95% UTL with 90% Coverage 95% BCA UTL with 90% Coverage 95% BOOKSTRAP (%) UTL with 90% Coverage	6.084 0.695 1251 1397 1070 1377 2212 570.9 612.1 1142 1290 1290 1264
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method Mean SD 95% UTL with 90% Coverage	585.2 619.1 1518 1616 1379 1604 2025 -3903 3203 920.5	DL/2 Substitution Method  Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Log ROS Method Mean in Original Scale SD in Original Scale SD in Original Scale 95% UTL with 90% Coverage 95% BCA UTL with 90% Coverage 95% BOOTSTAPP (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	6.084 0.695 1251 1397 1070 1377 2212 570.9 612.1 1142 1290 1290 1264 990.9
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method Mean SD 95% UTL with 90% Coverage  95% UPL (t) 90% Percentile (z) 95% Percentile (z)	585.2 619.1 1518 1616 1379 1604 2025 -3903 3203 920.5	DL/2 Substitution Method  Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Log ROS Method Mean in Original Scale SD in Original Scale 95% UTL with 90% Coverage 95% BCA UTL with 90% Coverage 95% BOOKSTRAP (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	6.084 0.695 1251 1397 1070 1377 2212 570.9 612.1 1142 1290 1290 1264 990.9 1247
	DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method Mean SD 95% UTL with 90% Coverage	585.2 619.1 1518 1616 1379 1604 2025 -3903 3203 920.5	DL/2 Substitution Method  Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Log ROS Method Mean in Original Scale SD in Original Scale SD in Original Scale 95% UTL with 90% Coverage 95% BCA UTL with 90% Coverage 95% BOOTSTAPP (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	6.084 0.695 1251 1397 1070 1377 2212 570.9 612.1 1142 1290 1290 1264 990.9 1247

1 1			· · · · · · · · · · · · · · · · · · ·	
	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values C	Only
	k star (bias corrected)		Data do not follow a Discernable Distribution (0	
	Theta Star			,
	nu star			
4 3				
	A-D Test Statistic	3.435	Nonparametric Statistics	
	5% A-D Critical Value		Kaplan-Meier (KM) Method	
	K-S Test Statistic		Mean	578.7
	5% K-S Critical Value			611.9
e 3	Data not Gamma Distributed at 5% Significance		SE of Mean	
* 1			95% KM UTL with 90% Coverage	1500
٠,	Assuming Gamma Distribution	1	95% KM Chebyshev UPL	
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
	Mean	586.2	90% Percentile (z)	1363
e 1	Median	452.4	95% Percentile (z)	1585
e x	SD	616	99% Percentile (z)	2002
	k star	0.645	, ,	
	Theta star	908.4	Gamma ROS Limits with Extrapolated Data	а
3 1	Nu star	148.4	95% Wilson Hilferty (WH) Approx. Gamma UPL	1612
. 1	95% Percentile of Chisquare (2k)	4.524	95% Hawkins Wixley (HW) Approx. Gamma UPL	1847
			95% WH Approx. Gamma UTL with 90% Coverage	
3 1	90% Percentile		95% HW Approx. Gamma UTL with 90% Coverage	1640
	95% Percentile			
3 4	99% Percentile	3389		
3 3				
3 *	Note: DL/2 is not a recommended method.			
	M MG/KG CHROMIUM  (br_na)			
			t and the	
	N. J. OVED		al Statistics	00
	Number of Valid Data		Number of New Potest Pate	_
	Number of Distinct Detected Data Tolerance Factor		Number of Non-Detect Data Percent Non-Detects	
	Tolerance Factor	1.///	Fercent Non-Detects	3.33 /0
	Daw Statistics		Log transformed Statistics	
-	Raw Statistics Minimum Detected	3.7	Log-transformed Statistics	1 308
	Minimum Detected		Minimum Detected	
	Minimum Detected Maximum Detected	18.1	Minimum Detected Maximum Detected	2.896
	Minimum Detected Maximum Detected Mean of Detected	18.1 8.698	Minimum Detected Maximum Detected Mean of Detected	2.896 2.079
	Minimum Detected Maximum Detected Mean of Detected SD of Detected	18.1 8.698 3.687	Minimum Detected  Maximum Detected  Mean of Detected  SD of Detected	2.896 2.079 0.417
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	18.1 8.698 3.687 0.35	Minimum Detected  Maximum Detected  Mean of Detected  SD of Detected  Minimum Non-Detect	2.896 2.079 0.417 -1.05
* 1	Minimum Detected Maximum Detected Mean of Detected SD of Detected	18.1 8.698 3.687 0.35	Minimum Detected  Maximum Detected  Mean of Detected  SD of Detected	2.896 2.079 0.417 -1.05
* 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	18.1 8.698 3.687 0.35	Minimum Detected  Maximum Detected  Mean of Detected  SD of Detected  Minimum Non-Detect	2.896 2.079 0.417 -1.05
* 1 * 1	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect	18.1 8.698 3.687 0.35 0.35	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect	2.896 2.079 0.417 -1.05
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect	18.1 8.698 3.687 0.35 0.35	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect	2.896 2.079 0.417 -1.05 -1.05
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect	18.1 8.698 3.687 0.35 0.35	Minimum Detected  Maximum Detected  Mean of Detected  SD of Detected  Minimum Non-Detect  Maximum Non-Detect  Maximum Non-Detect  Lognormal Distribution Test with Detected Value	2.896 2.079 0.417 -1.05 -1.05
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Mormal Distribution Test with Detected Values Shapiro Wilk Test Statistic	18.1 8.698 3.687 0.35 0.35 0.35	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect	2.896 2.079 0.417 -1.05 -1.05 -2.05
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect	18.1 8.698 3.687 0.35 0.35 0.35	Minimum Detected  Maximum Detected  Mean of Detected  SD of Detected  Minimum Non-Detect  Maximum Non-Detect  Maximum Non-Detect  Maximum Non-Detect  Lognormal Distribution Test with Detected Value  Shapiro Wilk Test Statistic	2.896 2.079 0.417 -1.05 -1.05 -0.974 0.926
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Mormal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	18.1 8.698 3.687 0.35 0.35 0.35	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Minimum Detected Value Minimum Detected Maximum Detected Mean of Detected Minimum Non-Detected Minimum Non-Detected Maximum Non-Detected Minimum Non-Detected Maximum Non-Detected Maximum Non-Detected Minimum Non-Detected Maximum Non-Detected Value Shapiro Wilk Test Statistic Shapiro Wilk Critical Value	2.896 2.079 0.417 -1.05 -1.05 -0.974 0.926
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Mormal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev Assuming Normal Distribution	18.1 8.698 3.687 0.35 0.35 0.35 Backgrou 6 Only 0.93 0.926	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Minimum Detected Value Minimum Detected Maximum Detected Mean of Detected Minimum Non-Detected Minimum Non-Detected Maximum Non-Detected Minimum Non-Detected Maximum Non-Detected Maximum Non-Detected Minimum Non-Detected Maximum Non-Detected Value Shapiro Wilk Test Statistic Shapiro Wilk Critical Value	2.896 2.079 0.417 -1.05 -1.05 -0.974 0.926
* * * * * * * * * * * * * * * * * * * *	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Mormal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Leve	18.1 8.698 3.687 0.35 0.35 0.35 Backgrou 6 Only 0.93 0.926	Minimum Detected  Maximum Detected  Mean of Detected  SD of Detected  Minimum Non-Detect  Maximum Non-Detect  Maximum Non-Detect  Maximum Non-Detect  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data appear Lognormal at 5% Significance Lognormal Lognormal at 5% Significance Lognormal Lognormal Lognormal Lognormal at 5% Significance Lognormal Lognormal at 5% Significance Lognormal Lognorm	2.896 2.079 0.417 -1.05 -1.05 -0.974 0.926
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method	18.1 8.698 3.687 0.35 0.35 0.35 Backgrou 6 Only 0.93 0.926	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maxi	2.896 2.079 0.417 -1.05 -1.05 0.974 0.926 evel
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Mormal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean	18.1 8.698 3.687 0.35 0.35 Backgrou 0.93 0.926 vel	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maxi	2.896 2.079 0.417 -1.05 -1.05 0.974 0.926 evel 1.952 0.809
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Mormal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean	18.1 8.698 3.687 0.35 0.35 Backgrou 6 Only 0.93 0.926 vel	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maxi	2.896 2.079 0.417 -1.05 -1.05 0.974 0.926 evel 1.952 0.809
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t)	18.1 8.698 3.687 0.35 0.35 Backgrou 6 Only 0.93 0.926 vel 8.414 3.943 15.42 15.23	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maxi	2.896 2.079 0.417 -1.05 -1.05 -1.05 0.974 0.926 evel 1.952 0.809 29.67
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage	18.1 8.698 3.687 0.35 0.35 Backgrou 6 Only 0.93 0.926 vel 8.414 3.943 15.42 15.23	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Le  Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage	2.896 2.079 0.417 -1.05 -1.05 0.974 0.926 evel 1.952 0.809 29.67 28.5
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t)	18.1 8.698 3.687 0.35 0.35 Backgrous Only 0.93 0.926 vel 8.414 3.943 15.42 15.23 13.47	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Let  Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t)	2.896 2.079 0.417 -1.05 -1.05 -1.05 0.974 0.926 evel 1.952 0.809 29.67 28.5 19.87
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t)	18.1 8.698 3.687 0.35 0.35 Backgrous Only 0.93 0.926 vel 8.414 3.943 15.42 15.23 13.47 14.9	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t)	2.896 2.079 0.417 -1.05 -1.05 -1.05 0.974 0.926 evel 1.952 0.809 29.67 28.5 19.87 26.66
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	18.1 8.698 3.687 0.35 0.35 Backgrous Only 0.93 0.926 vel 8.414 3.943 15.42 15.23 13.47 14.9	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	2.896 2.079 0.417 -1.05 -1.05 -1.05 0.974 0.926 evel 1.952 0.809 29.67 28.5 19.87 26.66
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	18.1 8.698 3.687 0.35 0.35 Backgrous 6 Only 0.93 0.926 vel 8.414 3.943 15.42 15.23 13.47 14.9 17.59	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	2.896 2.079 0.417 -1.05 -1.05 -1.05 0.974 0.926 evel 1.952 0.809 29.67 28.5 19.87 26.66
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Nor-Detect Maximum Nor-Detect Maximum Nor-Detect Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method Mean	18.1 8.698 3.687 0.35 0.35 <b>Backgrou</b> <b>Only</b> 0.93 0.926 <b>vel</b> 8.414 3.943 15.42 15.23 13.47 14.9 17.59	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Shapiro Wilk Test Statistic S% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Log Mean (Log Scale) SD (Log Scale)	2.896 2.079 0.417 -1.05 -1.05 -1.05 0.974 0.926 evel 1.952 0.809 29.67 28.5 19.87 26.66 46.28
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Nor-Detect Maximum Nor-Detect Maximum Nor-Detect Maximum Nor-Detect Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method Mean SD	18.1 8.698 3.687 0.35 0.35 0.35 Solution of the second of the seco	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Log Maximum Non-Detect Maximum Non-Detec	2.896 2.079 0.417 -1.05 -1.05 -1.05 0.974 0.926 evel 1.952 0.809 29.67 28.5 19.87 26.66 46.28 8.501 3.781
	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Nor-Detect Maximum Nor-Detect Maximum Nor-Detect Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method Mean	18.1 8.698 3.687 0.35 0.35 0.35 Solution of the second of the seco	Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Shapiro Wilk Test Statistic S% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Log Mean (Log Scale) SD (Log Scale)	2.896 2.079 0.417 -1.05 -1.05 -1.05 0.974 0.926 evel 1.952 0.809 29.67 28.5 19.87 26.66 46.28 8.501 3.781

		,		
1 1 1			05% BOALUTE 311 000% O	10.01
			95% BCA UTL with 90% Coverage	
			95% Bootstrap (%) UTL with 90% Coverage	
	95% UPL (t)	15.25	95% UPL (t)	16.89
	90% Percentile (z)	13.47	90% Percentile (z)	13.8
3 1	95% Percentile (z)		95% Percentile (z)	
, ,	99% Percentile (z)		99% Percentile (z)	
1 1	99% Percentile (2)	17.04	99% Percentile (2)	22.10
	Gamma Distribution Test with Detected Values		Data Distribution Test with Detected Values C	
3 4	k star (bias corrected)	5.509	Data appear Normal at 5% Significance Leve	el
3 4	Theta Star	1.579		
9 1	nu star	319.5		
, ,				
1 0	A-D Test Statistic	0.272	Nonparametric Statistics	
1 0			·	
	5% A-D Critical Value	-	Kaplan-Meier (KM) Method	
	K-S Test Statistic		Mean	
1 1	5% K-S Critical Value	0.163	SD	3.674
1 1	Data appear Gamma Distributed at 5% Significan	ce Level	SE of Mean	0.683
1 1			95% KM UTL with 90% Coverage	
1 1	Assuming Gamma Distribution		95% KM Chebyshev UPL	
1 4	Gamma ROS Statistics with Extrapolated Data			
_		0.40-	95% KM UPL (t)	
	Mean		90% Percentile (z)	
	Median	7.8	95% Percentile (z)	14.57
	SD	3.956	99% Percentile (z)	
	k star		33.3. 3.30.000 (2)	
	Theta star		Gamma ROS Limits with Extrapolated Data	
1 3		-	Ganina ROS Linius with Extrapolated Date	00.7
_	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	
	95% Percentile of Chisquare (2k)	5.672	95% Hawkins Wixley (HW) Approx. Gamma UPL	
			95% WH Approx. Gamma UTL with 90% Coverage	21.22
	90% Percentile	19.77	95% HW Approx. Gamma UTL with 90% Coverage	25.9
	95% Percentile	25 96		
· · · No	95% Percentile 99% Percentile ote: DL/2 is not a recommended method.			
1 1	99% Percentile			
	99% Percentile ote: DL/2 is not a recommended method.	40.42	Statistics	
	99% Percentile ote: DL/2 is not a recommended method.  I MG/KG CHROMIUM  (so_sb)	40.42 General	Statistics  Number of Distinct Observations	50
	99% Percentile  ote: DL/2 is not a recommended method.  I MG/KG CHROMIUM  (so_sb)  Total Number of Observations	40.42  General 100	Statistics  Number of Distinct Observations	59
	99% Percentile ote: DL/2 is not a recommended method.  I MG/KG CHROMIUM  (so_sb)	40.42  General 100		59
	99% Percentile  ote: DL/2 is not a recommended method.  I MG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor	40.42  General 100	Number of Distinct Observations	59
	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics	General 100 1.524	Number of Distinct Observations  Log-Transformed Statistics	
	99% Percentile  ote: DL/2 is not a recommended method.  I MG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum	General 100 1.524	Number of Distinct Observations  Log-Transformed Statistics  Minimum	1.825
	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum	General 100 1.524 6.2 21.3	Number of Distinct Observations  Log-Transformed Statistics	1.825
	99% Percentile  ote: DL/2 is not a recommended method.  I MG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum	General 100 1.524 6.2 21.3	Number of Distinct Observations  Log-Transformed Statistics  Minimum	1.825 3.059
	99% Percentile  ote: DL/2 is not a recommended method.  I MG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest	General 100 1.524 6.2 21.3 18.8	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest	1.825 3.059 2.934
M	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile	General 100 1.524 6.2 21.3 18.8 11.9	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile	1.825 3.059 2.934 2.477
M	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median	General 100 1.524 6.2 21.3 18.8 11.9 13.45	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median	1.825 3.059 2.934 2.477 2.599
• • • • • • • • • • • • • • • • • • •	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	General 100 1.524 6.2 21.3 18.8 11.9 13.45	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile	1.825 3.059 2.934 2.477 2.599 2.708
M	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	General 100 1.524 6.2 21.3 18.8 11.9 13.45 15	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	1.825 3.059 2.934 2.477 2.599 2.708 2.563
M	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	General 100 1.524 6.2 21.3 18.8 11.9 13.45 15 13.26 2.647	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	1.825 3.059 2.934 2.477 2.599 2.708
M	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	General 100 1.524 6.2 21.3 18.8 11.9 13.45 15 13.26 2.647	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	1.825 3.059 2.934 2.477 2.599 2.708 2.563
M	ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation	General 100 1.524 6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	1.825 3.059 2.934 2.477 2.599 2.708 2.563
M	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	General 100 1.524 6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	1.825 3.059 2.934 2.477 2.599 2.708 2.563
M	ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	General 100 1.524  6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	1.825 3.059 2.934 2.477 2.599 2.708 2.563
• • • • • • • • • • • • • • • • • • •	ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	General 100 1.524  6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	1.825 3.059 2.934 2.477 2.599 2.708 2.563
M	99% Percentile  ote: DL/2 is not a recommended method.  IMMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	General 100 1.524 6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225 Backgrour	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Mod Statistics  Lognormal Distribution Test	1.825 3.059 2.934 2.477 2.599 2.708 2.563 0.218
M	ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic	General 100 1.524  6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225  Backgrour	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Lilliefors Test Statistic	1.825 3.059 2.934 2.477 2.599 2.708 2.563 0.218
M	99% Percentile  ote: DL/2 is not a recommended method.  IMMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	General 100 1.524  6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225  Backgrour	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Mod Statistics  Lognormal Distribution Test	1.825 3.059 2.934 2.477 2.599 2.708 2.563 0.218
M	ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic	General 100 1.524  6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225  Backgrour  0.0857 0.0886	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Lilliefors Test Statistic	1.825 3.059 2.934 2.477 2.599 2.708 2.563 0.218
M	ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	General 100 1.524  6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225  Backgrour  0.0857 0.0886	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	1.825 3.059 2.934 2.477 2.599 2.708 2.563 0.218 0.124 0.0886
M	ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data appear Normal at 5% Significance Leve	General 100 1.524  6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225  Backgrour  0.0857 0.0886	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev	1.825 3.059 2.934 2.477 2.599 2.708 2.563 0.218
M M	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data appear Normal at 5% Significance Leven	General 100 1.524 6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225 Backgrour 0.0857 0.0886	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution	1.825 3.059 2.934 2.477 2.599 2.708 2.563 0.218 0.124 0.0886 el
M M	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data appear Normal at 5% Significance Leven  Assuming Normal Distribution  95% UTL with 90% Coverage	General 100 1.524 6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225 Backgrour 0.0857 0.0886 /el	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage	1.825 3.059 2.934 2.477 2.599 2.708 2.563 0.218 0.124 0.0886 el
1 1	ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t)	General 100 1.524 6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225 Backgrour 0.0857 0.0886 /el	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t)	1.825 3.059 2.934 2.477 2.599 2.708 2.563 0.218 0.124 0.0886 el
M M	99% Percentile  ote: DL/2 is not a recommended method.  IMG/KG CHROMIUM  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data appear Normal at 5% Significance Leven  Assuming Normal Distribution  95% UTL with 90% Coverage	General 100 1.524  6.2 21.3 18.8 11.9 13.45 15 13.26 2.647 0.2 -0.225  Backgrour  0.0857 0.0886 /el	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage	1.825 3.059 2.934 2.477 2.599 2.708 2.563 0.218 0.124 0.0886 el

1 1 1	Y F C D E		0 E 1 1 E	
	99% Percentile (z)	10.42	99% Percentile (z)	21.52
	99% Percentile (2)	19.42	99% Percentile (2)	21.32
	Gamma Distribution Test		Data Distribution Test	
	k star	22 27	Data appear Normal at 5% Significance Lev	rol .
	Theta Star		Data appear Normal at 5% Significance Lev	- CI
	MLE of Mean			
1 1	MLE of Standard Deviation			
	nu star			
	Tiu Star	4433		
	A-D Test Statistic	1 5 4	Nonparametric Statistics	
	5% A-D Critical Value		90% Percentile	16.02
* 1	K-S Test Statistic		95% Percentile	
* 1	5% K-S Critical Value		99% Percentile	
	Data not Gamma Distributed at 5% Significance		33 % r ercentile	10.03
	Data not Gamina Distributed at 3% Significance	Level		
	Assuming Gamma Distribution		95% UTL with 90% Coverage	16.7
* 1	90% Percentile	16.06	95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	16.71
	99% Percentile		95% BCA Bootstrap OTE with 90% Coverage 95% UPL	
	99% reicentile	20.00	95% OPL 95% Chebyshev UPL	
	95% WH Approx. Gamma UPL	18 22	Upper Threshold Limit Based upon IQR	
* 1	95% HW Approx. Gamma UPL		Oppor Threshold Elithic based upon IQN	10.00
* 1	95% WH Approx. Gamma UTL with 90% Coverage			
	95% HW Approx. Gamma UTL with 90% Coverage			
	35% TW Approx. Gaillina 61E with 90% Coverage	17.01		
0 1				
	M MG/KG CHROMIUM  (so_ss)			
		General	Statistics	
	Total Number of Observations		Number of Distinct Observations	72
1 1	Tolerance Factor	_	Training of Distiller and State (1997)	,_
1 7	1 diorande 1 deter	1.000		
	Raw Statistics		Log-Transformed Statistics	
	Minimum	4.8	Minimum	1.569
	Maximum	28.2	Maximum	
1 1	IVIGAIIIUIII	20.2	Maximum	3.339
	Second Largest		Second Largest	
		17.4		2.856
	Second Largest	17.4 8	Second Largest	2.856 2.079
	Second Largest First Quartile	17.4 8 11.7	Second Largest First Quartile	2.856 2.079 2.46
1 *	Second Largest First Quartile Median	17.4 8 11.7 13.7	Second Largest First Quartile Median	2.856 2.079 2.46 2.617
1 4	Second Largest First Quartile Median Third Quartile Mean	17.4 8 11.7 13.7	Second Largest First Quartile Median Third Quartile Mean	2.856 2.079 2.46 2.617
1	Second Largest First Quartile Median Third Quartile Mean	17.4 8 11.7 13.7 11.2 3.724	Second Largest First Quartile Median Third Quartile Mean	2.856 2.079 2.46 2.617 2.357
2 0	Second Largest First Quartile Median Third Quartile Mean SD	17.4 8 11.7 13.7 11.2 3.724 0.333	Second Largest First Quartile Median Third Quartile Mean	2.856 2.079 2.46 2.617 2.357
2 6 2 7 3 7 3 7	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594	Second Largest First Quartile Median Third Quartile Mean SD	2.856 2.079 2.46 2.617 2.357
2 T	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594	Second Largest First Quartile Median Third Quartile Mean	2.856 2.079 2.46 2.617 2.357
1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness Normal Distribution Test	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics Lognormal Distribution Test	2.856 2.079 2.46 2.617 2.357 0.355
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness Normal Distribution Test Lilliefors Test Statistic	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgrour	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics Lognormal Distribution Test Lilliefors Test Statistic	2.856 2.079 2.46 2.617 2.357 0.355
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgrour	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826
	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness Normal Distribution Test Lilliefors Test Statistic	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgrour	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics Lognormal Distribution Test Lilliefors Test Statistic	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826
	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgrour	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826
	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgrour 0.083	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el
1 e 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgrour 0.083 0.0826	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el
2 6 2 6 3 1	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t)	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgrour 0.083 0.0826	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t)	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el
1 0	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgroun 0.083 0.0826	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el
2 6 2 6 3 1	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgroun 0.083 0.0826 1 16.81 17.4 15.97 17.32	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el 18.02 19.06 16.64 18.92
2 6 2 6 3 1	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgroun 0.083 0.0826 1 16.81 17.4 15.97 17.32	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el 18.02 19.06 16.64 18.92
1 0	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgroun 0.083 0.0826 1 16.81 17.4 15.97 17.32	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el 18.02 19.06 16.64 18.92
2 6 2 6 3 1	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594 Backgroun 0.083 0.0826 1 16.81 17.4 15.97 17.32 19.86	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el 18.02 19.06 16.64 18.92 24.1
1 e 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Gamma Distribution Test k star	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594  Backgroun  0.083 0.0826  1 16.81 17.4 15.97 17.32 19.86	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el 18.02 19.06 16.64 18.92 24.1
	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Gamma Distribution Test k star Theta Star	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594  Backgroun  0.083 0.0826  1 16.81 17.4 15.97 17.32 19.86  8.465 1.323	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el 18.02 19.06 16.64 18.92 24.1
2 e 2 2 2 2 2	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Gamma Distribution Test k star Theta Star MLE of Mean	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594  Backgroun  0.083 0.0826  16.81 17.4 15.97 17.32 19.86  8.465 1.323 11.2	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el 18.02 19.06 16.64 18.92 24.1
2 e 2 2 2 2 2	Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Gamma Distribution Test k star Theta Star	17.4 8 11.7 13.7 11.2 3.724 0.333 0.594  Backgroun  0.083 0.0826  16.81 17.4 15.97 17.32 19.86  8.465 1.323 11.2 3.848	Second Largest First Quartile Median Third Quartile Mean SD  d Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	2.856 2.079 2.46 2.617 2.357 0.355 0.149 0.0826 el 18.02 19.06 16.64 18.92 24.1

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7 1 1				
	A-D Test Statistic	2.006	Nonparametric Statistics	
	5% A-D Critical Value	0.753	90% Percentile	15.26
	K-S Test Statistic	0.128	95% Percentile	16
	5% K-S Critical Value	0.0856	99% Percentile	17.36
	Data not Gamma Distributed at 5% Significance	Level		
1 7	Assuming Gamma Distribution		95% UTL with 90% Coverage	
	90% Percentile		95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
	99% Percentile	22.03	95% UPL	
1 1	OEO/ WILL Approx. Commo LIDI	10.00	95% Chebyshev UPL	
	95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	22.25
	95% HW Approx. Gamma UTL with 90% Coverage			
	95% HW Approx. Gamma UTL with 90% Coverage			
	35% TW Approx. Gaillina OTE with 30% Coverage	17.55		
* 1				
4 1				
* *	M MG/KG COBALT  (br_na)			
	1 1 1 1			
		General	Statistics	
4 1	Total Number of Observations	30	Number of Distinct Observations	27
	Tolerance Factor	1.777		
1 0	Raw Statistics	I	Log-Transformed Statistics	
	Minimum		Minimum	
1 1	Maximum		Maximum	
3 4	Second Largest		Second Largest	
3 4	First Quartile		First Quartile	
3 *	Median Third Quartile		Median Third Quartile	
1 1		14.15	Mean	
3 ×		8.029		0.854
1 *	Coefficient of Variation		OB	0.004
	Skewness			
		Backgroun	d Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
	Shapiro Wilk Test Statistic	0.891	Shapiro Wilk Test Statistic	0.767
	Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
	Data not Normal at 5% Significance Leve		Data not Lognormal at 5% Significance Lev	rel
* 1				
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
1 1	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)	32.82	99% Percentile (z)	82.05
	Gamma Distribution Test		Data Distribution Test	
	k star	2 192	Data Distribution 1 est  Data Follow Appr. Gamma Distribution at 5% Signific	ance L
* 1	Theta Star		- a.a. 7 ppr. admind biodibation at 0 /0 diginite	-41106 L
	MLE of Mean			
	MLE of Standard Deviation	_		
	nu star			
* 1	A-D Test Statistic	1.118	Nonparametric Statistics	ı
	5% A-D Critical Value		90% Percentile	20.76
	K-S Test Statistic		95% Percentile	
• •	5% K-S Critical Value		99% Percentile	35.68
	Pata follow Appx. Gamma Distribution at 5% Signific	ance Leve		
* 1				
	Assuming Gamma Distribution		95% UTL with 90% Coverage	31.7

		,		r
	200/ 5	00.00	050/ D 111 D 117 111 000/ 0	04.04
	90% Percentile		95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
	99% Percentile	45.12	95% UPL	
* 1 1			95% Chebyshev UPL	
* * *	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	27.04
	95% HW Approx. Gamma UPL	35		
	95% WH Approx. Gamma UTL with 90% Coverage	33.74		
	95% HW Approx. Gamma UTL with 90% Coverage	35.94		
† † ž				
1 1 4	M MG/KG COBALT  (so_sb)			
1 1 1		General	Statistics	
1 1 1	Total Number of Observations	100	Number of Distinct Observations	72
1 1 1	Tolerance Factor	1.524		
1 1 1	Raw Statistics		Log-Transformed Statistics	
1 1 1	Minimum	4.6	Minimum	1.526
	Maximum	19.9	Maximum	2.991
1 1 0	Second Largest	17.7	Second Largest	2.874
	First Quartile		First Quartile	
	Median		Median	
1 1 1	Third Quartile		Third Quartile	
1 1 1		9.784	Mean	
1 1 1		3.573		0.358
	Coefficient of Variation		30	0.336
* 1 1	Skewness	0.719		
			LO. vi vi	
1 1 4		Backgrour	nd Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
	Lilliefors Test Statistic		Lilliefors Test Statistic	
	Lilliefors Critical Value		Lilliefors Critical Value	
	Data not Normal at 5% Significance Leve	l	Data not Lognormal at 5% Significance Lev	el
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	95% UTL with 90% Coverage	15.23	95% UTL with 90% Coverage	
	95% UPL (t)		95% UPL (t)	16.69
4 4 1	90% Percentile (z)	14.36	90% Percentile (z)	14.53
	95% Percentile (z)		95% Percentile (z)	16.55
	99% Percentile (z)	18.1	99% Percentile (z)	21.13
	Gamma Distribution Test		Data Distribution Test	
1 1 1		7.76	Data do not follow a Discernable Distribution (	0.05)
	Theta Star		,	
	MLE of Mean			
	MLE of Standard Deviation			
	nu star			
4 4 3				
1 1 7	A-D Test Statistic		Nonparametric Statistics	
	5% A-D Critical Value	0.753	90% Percentile	14.81
	K-S Test Statistic	<u> </u>	95% Percentile	
	5% K-S Critical Value	0.0895	99% Percentile	
	Data not Gamma Distributed at 5% Significance			
	Assuming Gamma Distribution		95% UTL with 90% Coverage	16.8
	90% Percentile	14.47	95% Percentile Bootstrap UTL with 90% Coverage	
			95% BCA Bootstrap UTL with 90% Coverage	
			95% BCA Bootstrap OTE with 90% Coverage	
	95% Percentile	10.74		
	99% Percentile	19.74		
* * * *	99% Percentile		95% Chebyshev UPL	25.44
t t t	99% Percentile 95% WH Approx. Gamma UPL	16.23		25.44
T T T T	99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL	16.23 16.33	95% Chebyshev UPL	25.44
T 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	99% Percentile  95% WH Approx. Gamma UPL  95% HW Approx. Gamma UPL  95% WH Approx. Gamma UTL with 90% Coverage	16.23 16.33 15.53	95% Chebyshev UPL	25.44
1 6 6	99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL	16.23 16.33 15.53	95% Chebyshev UPL	25.44

		,		
4 1 7				
1 3 1				
4 2 4				
* 1 *	M MG/KG COBALT  (so_ss)			
T 1 F		Conorol	Statistics	
1 3 4	Total Number of Observations		Number of Distinct Observations	62
	Tolerance Factor		Number of Distinct Observations	02
	13.3.4.100 1 40.0.			
1 1 1	Raw Statistics		Log-Transformed Statistics	
	Minimum		Minimum	
	Maximum		Maximum	
	Second Largest		Second Largest	
4 4 1	First Quartile Median		First Quartile Median	
	Third Quartile	***	Third Quartile	
	Mean	-	Mean	
		2.402		0.563
	Coefficient of Variation	0.548		
1 + 1	Skewness	1.102		
		Backgrour	nd Statistics	
	Normal Distribution Test  Lilliefors Test Statistic	0.0005	Lognormal Distribution Test  Lilliefors Test Statistic	0.0072
T # 3	Lilliefors Critical Value		Lilliefors Critical Value	
	Data not Normal at 5% Significance Leve		Data not Lognormal at 5% Significance Leve	
		<u>-                                      </u>		
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z) 99% Percentile (z)		95% Percentile (z) 99% Percentile (z)	
	99 % Fercentile (2)	3.303	55 % reiceitile (2)	13.30
* * 1	Gamma Distribution Test		Data Distribution Test	
	k star	3.414	Data Follow Appr. Gamma Distribution at 5% Signific	ance Le
	Theta Star	-		
	MLE of Mean			
	MLE of Standard Deviation nu star			
	nu star	765.1		
	A-D Test Statistic	0 797	Nonparametric Statistics	
	5% A-D Critical Value		90% Percentile	7.32
	K-S Test Statistic	0.0686	95% Percentile	7.89
1 1 1	5% K-S Critical Value		99% Percentile	11.83
	Data follow Appx. Gamma Distribution at 5% Signific	ance Leve		
	Accuming Commo Distribution		0E9/ LITE 009/ 0	77
	Assuming Gamma Distribution 90% Percentile	7 562	95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
1 1 1			95% UPL	
1 1 1	99% Percentile	11.00		0.10
		11.00	95% Chebyshev UPL	14.9
1 2 1	99% Percentile 95% WH Approx. Gamma UPL	8.89	95% Chebyshev UPL Upper Threshold Limit Based upon IQR	14.9
* 3 7 * 3 7 * 3 7	99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL	8.89 9.03		14.9
1 2 1 1 2 1 1 2 1	99% Percentile  95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	8.89 9.03 8.303		14.9
1 3 1	99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL	8.89 9.03 8.303		14.9
	99% Percentile  95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	8.89 9.03 8.303		14.9
	99% Percentile  95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	8.89 9.03 8.303		14.9
* 3 * * * * * * * * * * * * * * * * * *	99% Percentile  95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	8.89 9.03 8.303 8.397	Upper Threshold Limit Based upon IQR	14.9
	99% Percentile  95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (br_na)	8.89 9.03 8.303 8.397	Upper Threshold Limit Based upon IQR  Statistics	14.9
	99% Percentile  95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	8.89 9.03 8.303 8.397 <b>General</b>	Upper Threshold Limit Based upon IQR	14.9

7 3	Y Y 1	h		,
	Raw Statistics		Log-Transformed Statistics	
1 *	Minimum		Minimum	
	Maximum		Maximum	
` '	Second Largest		Second Largest	3.976
1 1	First Quartile		First Quartile	
* 1	Median		Median	
' '	Third Quartile		Third Quartile	
	Mean		Mean	
, ,	=	14.6	SD	0.884
* 1	Coefficient of Variation	0.746		
	Skewness	1.337		
		Backgroun	d Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
,	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
1 1	Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
	Data not Normal at 5% Significance Leve	Ì	Data not Lognormal at 5% Significance Lev	el
	Assuming Normal Distribution		Assuming Lognormal Distribution	
1 1	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)	43.61	95% Percentile (z)	
	99% Percentile (z)	53.56	99% Percentile (z)	113.8
4 3	, ,			
4 3	Gamma Distribution Test		Data Distribution Test	
* *	k star	1.676	Data appear Gamma Distributed at 5% Significan	ce Lev
	Theta Star	11.68		
* *	MLE of Mean	19.59		
4 3	MLE of Standard Deviation	15.13		
	nu star	100.6		
3 0	A-D Test Statistic	0.267	Nonparametric Statistics	
3 1	5% A-D Critical Value	0.76	90% Percentile	38.93
		0.0003	0E0/ B ."	
1 1	K-S Test Statistic	0.0303	95% Percentile	51.01
3 7			95% Percentile 99% Percentile	
3 7	5% K-S Critical Value	0.162		
3 7 3 7 3 8		0.162		
3 T	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significant	0.162		58.06
3 4 3 4 3 3	5% K-S Critical Value	0.162 ce Level	99% Percentile 95% UTL with 90% Coverage	58.06 53.3
3 T	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile	0.162 <b>ce Level</b> 39.73	99% Percentile	58.06 53.3 53.97
3 4 3 4 3 4	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution	0.162 <b>ce Level</b> 39.73 49.18	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage	53.3 53.97 53.3
2 7 2 7 2 7 2 7 2 7	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile	0.162 <b>ce Level</b> 39.73 49.18	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL	53.3 53.97 53.3 56.32
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile	0.162 ce Level 39.73 49.18 70.36	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	53.3 53.97 53.3 56.32 84.29
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile	0.162 <b>ce Level</b> 39.73 49.18 70.36	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL	53.3 53.97 53.3 56.32 84.29
1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile	0.162 ce Level 39.73 49.18 70.36 50.06 52.26	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	53.3 53.97 53.3 56.32 84.29
1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL	0.162 <b>ce Level</b> 39.73  49.18  70.36  50.06  52.26  51.42	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	53.3 53.97 53.3 56.32 84.29
2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% HW Approx. Gamma UPL	0.162 <b>ce Level</b> 39.73  49.18  70.36  50.06  52.26  51.42	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	53.3 53.97 53.3 56.32 84.29
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL	0.162 <b>ce Level</b> 39.73  49.18  70.36  50.06  52.26  51.42	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	53.3 53.97 53.3 56.32 84.29
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL	0.162 <b>ce Level</b> 39.73  49.18  70.36  50.06  52.26  51.42	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	53.3 53.97 53.3 56.32 84.29
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UTL with 90% Coverage  95% HW Approx. Gamma UTL with 90% Coverage	0.162 <b>ce Level</b> 39.73  49.18  70.36  50.06  52.26  51.42	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	53.3 53.97 53.3 56.32 84.29
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL	0.162 <b>ce Level</b> 39.73  49.18  70.36  50.06  52.26  51.42	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	53.3 53.97 53.3 56.32 84.29
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UTL with 90% Coverage  95% HW Approx. Gamma UTL with 90% Coverage	0.162 <b>ce Level</b> 39.73  49.18  70.36  50.06  52.26  51.42  53.83	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	53.3 53.97 53.3 56.32 84.29
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UTL with 90% Coverage  95% HW Approx. Gamma UTL with 90% Coverage	0.162 ce Level  39.73 49.18 70.36  50.06 52.26 51.42 53.83  General	95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	53.3 53.97 53.3 56.32 84.29 45.48
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% HW Approx. Gamma UPL  95% WH Approx. Gamma UTL with  90% Coverage  95% HW Approx. Gamma UTL with  90% Coverage	0.162 ce Level  39.73 49.18 70.36  50.06 52.26 51.42 53.83  General	95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	53.3 53.97 53.3 56.32 84.29 45.48
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KG COPPER  (so_sb)  Total Number of Observations	0.162 ce Level  39.73 49.18 70.36  50.06 52.26 51.42 53.83  General	95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	53.3 53.97 53.3 56.32 84.29 45.48
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% HW Approx. Gamma UPL  95% WH Approx. Gamma UTL with  90% Coverage  95% HW Approx. Gamma UTL with  90% Coverage  MIMG/KG COPPER  (so_sb)  Total Number of Observations  Tolerance Factor	0.162 ce Level  39.73 49.18 70.36  50.06 52.26 51.42 53.83  General	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations	53.3 53.97 53.3 56.32 84.29 45.48
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KG COPPER  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics	0.162 ce Level  39.73 49.18 70.36  50.06 52.26 51.42 53.83  General 100 1.524	99% Percentile  95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics	53.3 53.97 53.3 56.32 84.29 45.48
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KG COPPER  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum	0.162 ce Level  39.73 49.18 70.36  50.06 52.26 51.42 53.83  General 100 1.524	95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics Number of Distinct Observations  Log-Transformed Statistics Minimum	53.3 53.97 53.3 56.32 84.29 45.48
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KG COPPER  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum	0.162 ce Level  39.73 49.18 70.36  50.06 52.26 51.42 53.83  General 100 1.524	95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum	58.06 53.3 53.97 53.3 56.32 84.29 45.48 75
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% HW Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KG COPPER  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest	0.162 ce Level  39.73 49.18 70.36  50.06 52.26 51.42 53.83  General 100 1.524	95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest	58.06 53.3 53.97 53.3 56.32 84.29 45.48 75 1.808 3.777 3.418
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KG COPPER  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum	0.162 ce Level  39.73 49.18 70.36  50.06 52.26 51.42 53.83  General 100 1.524  6.1 43.7 30.5 11.48	95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum	53.3 53.97 53.3 56.32 84.29 45.48 75

		,		
		45.40		0.004
		15.13	Mean	
	_	5.479	SD	0.329
* 1	Coefficient of Variation	0.362		
	Skewness	1.859		
		II.		
		Backgroun	nd Statistics	
* 1	Normal Distribution Test	Dackgroun	Lognormal Distribution Test	
	<u> </u>	0.100		0.0400
	Lilliefors Test Statistic		Lilliefors Test Statistic	1
	Lilliefors Critical Value		Lilliefors Critical Value	
	Data not Normal at 5% Significance Leve	I	Data appear Lognormal at 5% Significance Lognormal	evel
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	95% UTL with 90% Coverage	23 48	95% UTL with 90% Coverage	23 64
. ,	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
•	95% Percentile (z)		95% Percentile (z)	24.6
1	99% Percentile (z)	27.88	99% Percentile (z)	30.79
,			, ,	
	Gamma Distribution Test		Data Distribution Test	
٠	k star	8 886	Data appear Gamma Distributed at 5% Significan	co I ov
,	Theta Star		Data appear Gariinia Distributeu at 5% Significati	CC LCV
1				1
	MLE of Mean			
_	MLE of Standard Deviation	5.075		
,	nu star	1777		
*	A-D Test Statistic	0.613	Nonparametric Statistics	1
1	5% A-D Critical Value		90% Percentile	21 21
,				
Ļ	K-S Test Statistic		95% Percentile	
	5% K-S Critical Value		99% Percentile	30.63
٠	Data appear Gamma Distributed at 5% Significan	ce Level		
1	Assuming Gamma Distribution		95% UTL with 90% Coverage	23.6
	90% Percentile	21.80	95% Percentile Bootstrap UTL with 90% Coverage	
,	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
_				
	99% Percentile	29.36	95% UPL	
,			95% Chebyshev UPL	
1 1	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	26.54
		04.44		
,	95% HW Approx. Gamma UPL	24.44		
	95% HW Approx. Gamma UPL			
	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	23.38		
*	95% HW Approx. Gamma UPL	23.38		
0 1	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	23.38		
7 7	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	23.38		
2 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	23.38		
* * * * * * * * * * * * * * * * * * *	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)	23.38 23.42 General	Statistics	
* * * * * * * * * * * * * * * * * * *	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data	23.38 23.42 <b>General</b> 115	Number of Detected Data	75
7	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)	23.38 23.42 <b>General</b> 115		75
7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data	23.38 23.42 <b>General</b> 115 54	Number of Detected Data	75 40
* * * * * * * * * * * * * * * * * * *	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor	23.38 23.42 <b>General</b> 115 54	Number of Detected Data Number of Non-Detect Data Percent Non-Detects	75 40
* * * * * * * * * * * * * * * * * * *	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics	23.38 23.42 General 115 54 1.506	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics	75 40 34.789
* * * * * * * * * * * * * * * * * * *	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected	23.38 23.42 General 115 54 1.506	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected	75 40 34.789
* * * * * * * * * * * * * * * * * * *	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected	23.38 23.42 General 115 54 1.506	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected	75 40 34.789
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected	23.38 23.42 General 115 54 1.506 1.6 20.3 7.051	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected	75 40 34.789 0.47 3.011 1.799
* * * * * * * * * * * * * * * * * * *	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected	23.38 23.42 General 115 54 1.506 1.6 20.3 7.051	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected	75 40 34.789 0.47 3.011 1.799
* * * * * * * * * * * * * * * * * * *	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected	23.38 23.42 General 115 54 1.506 1.6 20.3 7.051 4.231	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected	75 40 34.789 0.47 3.011 1.799 0.551
	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected	23.38 23.42 General 115 54 1.506 1.6 20.3 7.051 4.231 2.4	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected	75 40 34.789 0.47 3.011 1.799 0.551 0.875
	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect	23.38 23.42 General 115 54 1.506 1.6 20.3 7.051 4.231 2.4	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect	75 40 34.789 0.47 3.011 1.799 0.551 0.875
	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect	General 115 54 1.506  1.6 20.3 7.051 4.231 2.4 18.2	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect	75 40 34.789 0.47 3.011 1.799 0.551 0.875 2.901
	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is	23.38 23.42 General 115 54 1.506 1.6 20.3 7.051 4.231 2.4 18.2	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect	75 40 34.789 0.47 3.011 1.799 0.551 0.875 2.901
	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect	23.38 23.42 General 115 54 1.506 1.6 20.3 7.051 4.231 2.4 18.2	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect	75 40 34.78 <sup>4</sup> 0.47 3.011 1.799 0.551 0.875 2.901
	95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG COPPER  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is	23.38 23.42 General 115 54 1.506 1.6 20.3 7.051 4.231 2.4 18.2	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect	75 40 34.789 0.47 3.011 1.799 0.551 0.875 2.901

	y y c p 1		0 E 1 1 E	r
	Normal Distribution Test with Detected Values	Only	Lognormal Distribution Test with Detected Value	e Only
	Lilliefors Test Statistic		Lilliefors Test Statistic	
4 4 3	5% Lilliefors Critical Value		5% Lilliefors Critical Value	
	Data not Normal at 5% Significance Leve		Data not Lognormal at 5% Significance Lev	
	Data not Normal at 5% Significance Leve		Data not Lognormal at 5% dignificance Lev	Ci
	Assuming Normal Distribution		Assuming Lognormal Distribution	
* 1 !	DL/2 Substitution Method		DL/2 Substitution Method	
* 1 1	Mean	6.07	Mean (Log Scale)	1.64
* 1 1	4	3.837	SD (Log Scale)	
4 3 4	95% UTL 90% Coverage		95% UTL 90% Coverage	
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
e 1 1	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)		99% Percentile (z)	
	99 % Fercentile (2)	13	99 % Fercendie (2)	13.11
	Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
	Mean Mean	10.00	Mean in Original Scale	6.066
	4	4.2	SD in Original Scale	
	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	95% OTE WITH 90% Coverage	10.4	95% OTL With 90% Coverage 95% BCA UTL with 90% Coverage	
			95% Bootstrap (%) UTL with 90% Coverage	
	95% UPL (t)	17.07	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t)	
	95% OPL (t) 90% Percentile (z)		95% OPL (t) 90% Percentile (z)	
	95% Percentile (z)		90% Percentile (z) 95% Percentile (z)	
	95% Percentile (z) 99% Percentile (z)		95% Percentile (z) 99% Percentile (z)	
	99% Percentile (2)	19.65	99% Percentile (2)	10.64
	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values 0	)nh/
	k star (bias corrected)		Data do not follow a Discernable Distribution (0	
	Theta Star		Data do flot follow a Discernable Distribution (o	.03)
	nu star			
	Tiu Stai	431.3		
	A-D Test Statistic	1 116	Nonparametric Statistics	
	5% A-D Critical Value		Kaplan-Meier (KM) Method	
	K-S Test Statistic		Mean	6 102
	5% K-S Critical Value			3.81
	Data not Gamma Distributed at 5% Significance		SE of Mean	
	Data not Gamma Distributed at 5% Significance	Level	95% KM UTL with 90% Coverage	
1	Assuming Gamma Distribution		95% KM Chebyshev UPL	
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
		6.383	90% Percentile (z)	
	Median		95% Percentile (z)	
		3.663	99% Percentile (z)	
		2.041	3370 1 CICCITUTE (2)	
	Theta star		Gamma ROS Limits with Extrapolated Data	а
	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	
	95% Percentile of Chisquare (2k)		95% Hawkins Wixley (HW) Approx. Gamma UPL	
	30 % Fercentile of Offisquare (2k)	0.010	95% WH Approx. Gamma UTL with 90% Coverage	
	90% Percentile	12 35	95% HW Approx. Gamma UTL with 90% Coverage	
	95% Percentile		30.0 THE APPLIANT GUILLING OF EWILL 30.00 GOVERAGE	10.0
	99% Percentile			
	55761 CICCITITE		1	
	Note: DL/2 is not a recommended method.			
1 1	Note: DL/2 is not a recommended method.			
1 4	Note: DL/2 is not a recommended method.			
1 1				
1 1	Note: DL/2 is not a recommended method.  M MG/KG IRON  (br_na)			
1 4		General	Statistics	
. 1 4	M MG/KG IRON  (br_na)			29
	M MG/KG IRON  (br_na)  Total Number of Observations	30	Statistics  Number of Distinct Observations	29
	M MG/KG IRON  (br_na)	30		29
1 5 F	M MG/KG IRON  (br_na)  Total Number of Observations Tolerance Factor	30	Number of Distinct Observations	29
1 2 2 1 1 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 2 1 1 2	M MG/KG IRON  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics	30 1.777	Number of Distinct Observations  Log-Transformed Statistics	
	M MG/KG IRON  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum	30 1.777 2040	Number of Distinct Observations  Log-Transformed Statistics  Minimum	7.621
	M MG/KG IRON  (br_na)  Total Number of Observations Tolerance Factor  Raw Statistics	30 1.777 2040 61600	Number of Distinct Observations  Log-Transformed Statistics	7.621 11.03

1 1 1 +	y 8 C D 1	١.	0 K I I K	
	First Quartile	21250	First Quartile	0.068
1 1 1 0	First Quartile Median		First Quartile Median	
	Third Quartile			
1 1 1 1		28714	Third Quartile	
		12108	Mean	
	Coefficient of Variation		20	0.622
	Skewness			
1 1 1 4	Skewiless	0.279		
1 1 1 1		Backgroup	d Statistics	
1 1 1 1	Normal Distribution Test	Dackgroun	Lognormal Distribution Test	
1 1 1 +	Shapiro Wilk Test Statistic	0 977	Shapiro Wilk Test Statistic	0 795
1 1 1 1	Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
1 1 1 1	Data appear Normal at 5% Significance Lev		Data not Lognormal at 5% Significance Lev	
1 1 1 1			3	
1 1 1 1	Assuming Normal Distribution		Assuming Lognormal Distribution	
1 1 1 1	95% UTL with 90% Coverage		95% UTL with 90% Coverage	76180
1 1 1 1	95% UPL (t)	49627	95% UPL (t)	
1 1 4 4	90% Percentile (z)		90% Percentile (z)	
1 1 1 1	95% Percentile (z)		95% Percentile (z)	
1 1 1 1	99% Percentile (z)	56882	99% Percentile (z)	107220
	Gamma Distribution Test	T	Data Distribution Test	
	k star		Data appear Normal at 5% Significance Lev	rel
	Theta Star			
	MLE of Mean MLE of Standard Deviation	_		
	MLE of Standard Deviation  nu star			
	nu star	217.0		
1 1 1 1	A-D Test Statistic	0.874	Nonparametric Statistics	
1 1 1 1	5% A-D Critical Value		90% Percentile	40420
1 1 1 +	K-S Test Statistic		95% Percentile	
1 1 4 0	5% K-S Critical Value		99% Percentile	
1 1 1 1	Data follow Appx. Gamma Distribution at 5% Signific			
1 1 1 1				
1 1 1 1	Assuming Gamma Distribution		95% UTL with 90% Coverage	
1 3 4 4	90% Percentile		95% Percentile Bootstrap UTL with 90% Coverage	
			OFO/ DOA Bootstrop LITI with OOO/ Coverege	19160
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
			95% UPL	53570
1 2 4 4	95% Percentile 99% Percentile	74750	95% UPL 95% Chebyshev UPL	53570 82364
1 2 4 4	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL	74750 57815	95% UPL	53570 82364
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL	74750 57815 60305	95% UPL 95% Chebyshev UPL	53570 82364
1166	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	74750 57815 60305 58962	95% UPL 95% Chebyshev UPL	53570 82364
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL	74750 57815 60305 58962	95% UPL 95% Chebyshev UPL	53570 82364
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	74750 57815 60305 58962	95% UPL 95% Chebyshev UPL	53570 82364
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	74750 57815 60305 58962	95% UPL 95% Chebyshev UPL	53570 82364
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	74750 57815 60305 58962	95% UPL 95% Chebyshev UPL	53570 82364
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	74750 57815 60305 58962	95% UPL 95% Chebyshev UPL	53570 82364
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	74750 57815 60305 58962 61618	95% UPL 95% Chebyshev UPL	53570 82364
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	74750 57815 60305 58962 61618 General	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	53570 82364 54475
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG IRON  (so_sb)	74750 57815 60305 58962 61618 <b>General</b>	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics	53570 82364 54475
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG IRON  (so_sb)  Total Number of Observations Tolerance Factor	74750 57815 60305 58962 61618 <b>General</b>	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations	53570 82364 54475
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG IRON  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics	74750 57815 60305 58962 61618 <b>General</b> 100 1.524	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics	53570 82364 54475 85
	95% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL 95% HW Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG IRON  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum	74750 57815 60305 58962 61618 <b>General</b> 100 1.524	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum	53570 82364 54475 85 85 9.269
	95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG IRON  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum	74750 57815 60305 58962 61618  General 100 1.524	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum	53570 82364 54475 85 85 9.269 10.85
	95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  MIMG/KGIRONI (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest	74750 57815 60305 58962 61618  General 100 1.524  10600 51700 42600	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest	53570 82364 54475 85 85 9.269 10.85 10.66
	95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG IRON  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile	74750 57815 60305 58962 61618  General 100 1.524  10600 51700 42600 16375	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile	53570 82364 54475 85 85 9.269 10.85 10.66 9.704
	95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG IRON  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median	74750 57815 60305 58962 61618  General 100 1.524  10600 51700 42600 16375 22650	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median	82364 54475 82364 54475 85 85 9.269 10.85 10.66 9.704 10.03
	95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG IRON  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	74750 57815 60305 58962 61618  General 100 1.524  10600 51700 42600 16375 22650 29000	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	82364 54475 82364 54475 85 85 9.269 10.85 10.66 9.704 10.03 10.28
	95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% HW Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG IRON  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	74750 57815 60305 58962 61618  General 100 1.524  10600 51700 42600 16375 22650 29000 23493	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	82364 54475 82364 54475 85 85 9.269 10.85 10.66 9.704 10.03 10.28 10.01
	95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG IRON  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	74750 57815 60305 58962 61618  General 100 1.524  10600 51700 42600 16375 22650 29000 23493 8109	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	82364 54475 82364 54475 85 85 9.269 10.85 10.66 9.704 10.03 10.28
	95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% HW Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG IRON  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	74750 57815 60305 58962 61618  General 100 1.524  10600 51700 42600 16375 22650 29000 23493 8109 0.345	95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	82364 54475 82364 54475 85 85 9.269 10.85 10.66 9.704 10.03 10.28 10.01

5 # 2	y , c , 1		o 1 1 1 r	
•		Backgrou	nd Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
	Lilliefors Test Statistic		Lilliefors Test Statistic	
	Lilliefors Critical Value		Lilliefors Critical Value	
	Data not Normal at 5% Significance Leve	·	Data appear Lognormal at 5% Significance Lo	evel
	According Normal Distribution		Accoming Lognormal Distribution	
	Assuming Normal Distribution  95% UTL with 90% Coverage	25051	Assuming Lognormal Distribution 95% UTL with 90% Coverage	27200
	95% UPL (t)		95% UPL (t)	
. ,	90% Percentile (z)		90% Percentile (z)	
* 1	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)	1	99% Percentile (z)	
	00 % 1 010011all0 (2)	12007	55 % T G156111115 (2)	10010
	Gamma Distribution Test		Data Distribution Test	
# 1	k star	8.609	Data appear Lognormal at 5% Significance Le	evel
	Theta Star		11 0	
	MLE of Mean	23493		
	MLE of Standard Deviation	8007		
	nu star	1722		
,				
7	A-D Test Statistic		Nonparametric Statistics	
	5% A-D Critical Value		90% Percentile	
	K-S Test Statistic		95% Percentile	
	5% K-S Critical Value		99% Percentile	42691
	Data not Gamma Distributed at 5% Significance	e Level		
	A service Occurs Bird in the		050/ 1171 31 000/ 0	25400
1 0	Assuming Gamma Distribution  90% Percentile	24100	95% UTL with 90% Coverage	
1 1	95% Percentile		95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage	
1 1	99% Percentile		95% BCA Bootstrap OTE with 90% Coverage 95% UPL	
	99% Percentile	40002	95% Chebyshev UPL	
3 1	95% WH Approx. Gamma UPL	38127	Upper Threshold Limit Based upon IQR	
2 1	95% HW Approx. Gamma UPL		Opper Threshold Elinic Based aport Qiv	<del>-</del> 77330
2 4	95% WH Approx. Gamma UTL with 90% Coverage			
	195% HW Approx Gamma IIII with 90% Coverage	36716		
1 +	95% HW Approx. Gamma UTL with 90% Coverage	36716		
1 F	MIMG/KGIRONI (so_ss)	36716		
2 0 2 0			Statistics	
2 8	M MG/KG IRON  (so_ss)	General	Statistics  Number of Distinct Observations	91
3 6		General	Statistics  Number of Distinct Observations	91
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	M MG/KG IRON  (so_ss)  Total Number of Observations	General		91
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics	<b>General</b> 115 1.506		91
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum	<b>General</b> 115 1.506	Number of Distinct Observations  Log-Transformed Statistics  Minimum	8.689
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum	General 115 1.506 5940 53900	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum	8.689 10.89
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest	General 115 1.506 5940 53900 43300	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest	8.689 10.89 10.68
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile	General 115 1.506 5940 53900 43300 10150	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile	8.689 10.89 10.68 9.225
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median	General 115 1.506 5940 53900 43300 10150 15300	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median	8.689 10.89 10.68 9.225 9.636
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	General 115 1.506 5940 53900 43300 10150 15300 18750	Number of Distinct Observations  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile	8.689 10.89 10.68 9.225 9.636 9.839
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	General 115 1.506 5940 53900 43300 10150 15300 18750 15655	Log-Transformed Statistics  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	8.689 10.89 10.68 9.225 9.636 9.839 9.58
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	General 115 1.506 5940 53900 43300 10150 15300 18750 15655 6720	Log-Transformed Statistics  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	8.689 10.89 10.68 9.225 9.636 9.839
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation	General 115 1.506 5940 53900 43300 10150 15300 18750 15655 6720 0.429	Log-Transformed Statistics  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	8.689 10.89 10.68 9.225 9.636 9.839 9.58
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	General 115 1.506  5940 53900 43300 10150 15300 18750 15655 6720 0.429 2.17	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	8.689 10.89 10.68 9.225 9.636 9.839 9.58
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	General 115 1.506  5940 53900 43300 10150 15300 18750 15655 6720 0.429 2.17	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	8.689 10.89 10.68 9.225 9.636 9.839 9.58
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test	General 115 1.506  5940 53900 43300 10150 15300 18750 15655 6720 0.429 2.17  Backgroui	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Ad Statistics  Lognormal Distribution Test	8.689 10.89 10.68 9.225 9.636 9.839 9.58 0.394
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic	General 115 1.506  5940 53900 43300 10150 15300 18750 15655 6720 0.429 2.17  Backgroul	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Ad Statistics  Lognormal Distribution Test Lilliefors Test Statistic	8.689 10.89 10.68 9.225 9.636 9.839 9.58 0.394
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	General 115 1.506  5940 53900 43300 10150 15300 18750 15655 6720 0.429 2.17  Backgroul  0.102 0.0826	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Ad Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	8.689 10.89 10.68 9.225 9.636 9.839 9.58 0.394
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic	General 115 1.506  5940 53900 43300 10150 15300 18750 15655 6720 0.429 2.17  Backgroul  0.102 0.0826	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Ad Statistics  Lognormal Distribution Test Lilliefors Test Statistic	8.689 10.89 10.68 9.225 9.636 9.839 9.58 0.394
	M MG/KG IRON  (so_ss)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	General 115 1.506  5940 53900 43300 10150 15300 18750 15655 6720 0.429 2.17  Backgroul  0.102 0.0826	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Ad Statistics  Lognormal Distribution Test Lilliefors Test Statistic Lilliefors Critical Value	8.689 10.89 10.68 9.225 9.636 9.839 9.58 0.394

F F 1	95% UPL (t)	26947	95% UPL (t)	27907
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)	31288	99% Percentile (z)	36188
	Gamma Distribution Test		Data Distribution Test	
	k star		Data do not follow a Discernable Distribution (	0.05)
	Theta Star			
	MLE of Mean	15655		
	MLE of Standard Deviation	6191		
* * 1	nu star	1471		
	A-D Test Statistic	1.241	Nonparametric Statistics	
. 1 .	5% A-D Critical Value	0.754	90% Percentile	22840
	K-S Test Statistic	0.0951	95% Percentile	23890
	5% K-S Critical Value		99% Percentile	
1 1	Data not Gamma Distributed at 5% Significance		OO 70 T OF OOTHING	10002
	Data not damina distributed at 5% dignineance	LOVOI		
	Assuming Gamma Distribution		95% UTL with 90% Coverage	33500
	90% Percentile	22027	95% Percentile Bootstrap UTL with 90% Coverage	
* 1 1				
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
T 1 A	99% Percentile	33516	95% UPL	
			95% Chebyshev UPL	
	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	31650
	95% HW Approx. Gamma UPL			
	95% WH Approx. Gamma UTL with 90% Coverage			
	95% HW Approx. Gamma UTL with 90% Coverage	25764		
	M MG/KG LEAD  (br_na)			
* * *	M MG/KG LEAD  (br_na)	General	Statistics	
* * *	M MG/KG LEAD  (br_na)  Total Number of Observations		Statistics  Number of Distinct Observations	29
		30		29
	Total Number of Observations	30		29
* * * *	Total Number of Observations	30		29
	Total Number of Observations Tolerance Factor	30 1.777	Number of Distinct Observations	
	Total Number of Observations Tolerance Factor  Raw Statistics	30 1.777 0.965	Number of Distinct Observations  Log-Transformed Statistics	-0.0356
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum	30 1.777 0.965 31	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum	-0.0356 3.434
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum	30 1.777 0.965 31 26.2	Number of Distinct Observations  Log-Transformed Statistics  Minimum	-0.0356 3.434 3.266
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile	30 1.777 0.965 31 26.2 4.85	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile	-0.0356 3.434 3.266 1.579
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median	30 1.777 0.965 31 26.2 4.85 7.35	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median	-0.0356 3.434 3.266 1.579 1.995
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	0.965 31 26.2 4.85 7.35 13.1	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile	-0.0356 3.434 3.266 1.579 1.995 2.573
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38	Log-Transformed Statistics  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173	Log-Transformed Statistics  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	-0.0356 3.434 3.266 1.579 1.995 2.573
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788	Log-Transformed Statistics  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788	Log-Transformed Statistics  Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean  SD	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics Lognormal Distribution Test	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour	Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847  0.976 0.927 evel
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution 95% UTL with 90% Coverage	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Matistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution 95% UTL with 90% Coverage	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847  0.976 0.927 evel
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847  0.976 0.927 evel
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution 95% UTL with 90% Coverage	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour 0.862 0.927	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Matistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution 95% UTL with 90% Coverage	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847  0.976 0.927 evel  34.21 32.8
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t)	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour 0.862 0.927	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847  0.976 0.927 evel  34.21 32.8 22.48
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour 0.862 0.927	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Matistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847 0.976 0.927 evel 34.21 32.8 22.48 30.59
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t)	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour 0.862 0.927	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Md Statistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847 0.976 0.927 evel 34.21 32.8 22.48 30.59
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour 0.862 0.927	Log-Transformed Statistics  Minimum  Maximum  Second Largest  First Quartile  Median  Third Quartile  Mean  SD  Maximum  Second Largest  Median  Third Quartile  Mean  SD  Mean  SD  Maximum  Median  Third Quartile  Mean  SD  Mean  SD  Maximum  Median  Third Quartile  Mean  SD  Mean  SD  Maximum  Mean  SD  Mean  SD  Mean  SD  Maximum  Mean  SD  Mean  SD  Maximum  Mean  SD  Maximum  Mean  SD  Mean  SD  Maximum  Mean  SD  Mean  SD  Mean  Mean  SD  Mean  SD  Mean  Mean  SD  Mean  Mean  SD  Mean  Mean  SD  Mean  Mean  SD  Mean  Mean  SD  Mean  Mean  SD  Mean  Mean  Mean  SD  Mean  Mean  Mean  SD  Mean  Mean  Mean  SD  Mean  Mean  Mean  SD  Mean  Mean  Mean  SD  Mean  Mean  Mean  SD  Mean  Mean  Mean  SD  Mean  Mean  Mean  Mean  SD  Mean  Mean  Mean  Mean  SD  Mean  Mean  Mean  Mean  SD  Mean  Mean  Mean  Mean  SD  Mean  Mean  Mean  SD  Mean  Mean  Mean  Mean  SD  Mean  Mean  Mean  Mean  SD  Mean  Mean  Mean  SD  Mean  Mean  Mean  Mean  SD  Mean  Mean  Mean  Mean  SD  Mean  Mean  Mean  Mean  Mean  Mean  Mean  Mean  SD  Mean	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847 0.976 0.927 evel 34.21 32.8 22.48 30.59
	Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Level  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	30 1.777 0.965 31 26.2 4.85 7.35 13.1 10.38 8.173 0.788 1.159 Backgrour 0.862 0.927 24.9 24.9 20.85 23.82 29.39	Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD  Matistics  Lognormal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	-0.0356 3.434 3.266 1.579 1.995 2.573 2.027 0.847  0.976 0.927 evel  34.21 32.8 22.48 30.59 54.49

		,		r
1 + 1 1		40.00		
	MLE of Mean			
	MLE of Standard Deviation	8.219		
1 + 1 1	nu star	95.65		
1 + 1 1				
1 + 1 1	A-D Test Statistic	0.297	Nonparametric Statistics	
1 + 1 +	5% A-D Critical Value	0.761	90% Percentile	24.49
1 + 1 1	K-S Test Statistic		95% Percentile	
1 + 1 +	5% K-S Critical Value		99% Percentile	
1 + 1 +			99% Percentile	29.01
	Data appear Gamma Distributed at 5% Significan	ce Level		
	Assuming Gamma Distribution		95% UTL with 90% Coverage	26.2
	90% Percentile	21.31	95% Percentile Bootstrap UTL with 90% Coverage	26.68
	95% Percentile	26.49	95% BCA Bootstrap UTL with 90% Coverage	
1 + 1 1	99% Percentile	38 15	95% UPL	
	00701 010011110	00.10	95% Chebyshev UPL	
1 + 1 +	050/ 14/11 4 0 11/10	07.00		
	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	25.48
	95% HW Approx. Gamma UPL			
	95% WH Approx. Gamma UTL with 90% Coverage	27.84		
	95% HW Approx. Gamma UTL with 90% Coverage	28.82		
	11			
1				
	MINAO (KOU FARI (			
	M MG/KG LEAD  (so_sb)			
		General	Statistics	
	Total Number of Observations	100	Number of Distinct Observations	55
	Tolerance Factor	1.524		
	Raw Statistics		Log-Transformed Statistics	
		E O	Log-Transformed Statistics Minimum	1 640
	Minimum	-	-	
	Maximum		Maximum	
	Second Largest		Second Largest	
	First Quartile	6.875	First Quartile	1.928
	Median	7.85	Median	2.06
	Third Quartile		Third Quartile	
		8.261	Mean	
		1.911		0.219
			30	0.219
	Coefficient of Variation			
	Skewness	0.977		
		Backgroun	d Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
	Lilliefors Test Statistic	0.132	Lilliefors Test Statistic	0.0869
	Lilliefors Critical Value	0.0886	Lilliefors Critical Value	0.0886
	Data not Normal at 5% Significance Leve		Data appear Lognormal at 5% Significance Le	
	Data not normal at 0 /0 digililicance Leve	•	Data appear Lognormal at 0/0 Olymnodilce Le	
	Aggregie a Name - I Pi-Adharia		Approximation and an array of District of	
	Assuming Normal Distribution	44.47	Assuming Lognormal Distribution	44.05
	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)	10.71	90% Percentile (z)	
1 + 3 1	95% Percentile (z)	11.4	95% Percentile (z)	
+ 1 1	99% Percentile (z)		99% Percentile (z)	
1 + 1 1		1	(-)	
			II	
	Gamma Distribution Teet		Data Distribution Test	
	Gamma Distribution Test	20.01	Data Distribution Test	aval
1 + 2 +	k star		Data Distribution Test Data appear Lognormal at 5% Significance Le	evel
	k star Theta Star	0.413		evel
1 + 1 +	k star Theta Star MLE of Mean	0.413 8.261		evel
1 + 2 F	k star Theta Star	0.413 8.261		evel
1 + 3 +	k star Theta Star MLE of Mean	0.413 8.261 1.847		evel
1 0 3 0	k star Theta Star MLE of Mean MLE of Standard Deviation	0.413 8.261 1.847		evel
1 0 2 7	k star Theta Star MLE of Mean MLE of Standard Deviation nu star	0.413 8.261 1.847 4002	Data appear Lognormal at 5% Significance Le	evel
1 * 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1 *	k star Theta Star MLE of Mean MLE of Standard Deviation nu star A-D Test Statistic	0.413 8.261 1.847 4002	Data appear Lognormal at 5% Significance Le	
	k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value	0.413 8.261 1.847 4002 1.38 0.75	Data appear Lognormal at 5% Significance Le  Nonparametric Statistics  90% Percentile	10.8
	k star Theta Star MLE of Mean MLE of Standard Deviation nu star A-D Test Statistic	0.413 8.261 1.847 4002 1.38 0.75 0.102	Data appear Lognormal at 5% Significance Le	10.8 12.24

	у в с в			
	Data and Carrier and a 150' Circlis	11		
	Data not Gamma Distributed at 5% Significance	Level		
	Assuming Gamma Distribution		95% UTL with 90% Coverage	
	90% Percentile	10.7	95% Percentile Bootstrap UTL with 90% Coverage	11.66
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
	99% Percentile		95% UPL	
	9970 Fercentile	13.13		
			95% Chebyshev UPL	
	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	12.5
	95% HW Approx. Gamma UPL			
	95% WH Approx. Gamma UTL with 90% Coverage	11.2		
	95% HW Approx. Gamma UTL with 90% Coverage			
	теления при при при при при при при при при при			
1				
	M MG/KG LEAD  (so_ss)			
		General	Statistics	
	Total Number of Observations	115	Number of Distinct Observations	92
1 * * 1	Tolerance Factor			
: • • •	Tolerance Factor	1.500		
	B Outralia		Law Taxas Comment On the Co	
,	Raw Statistics	100	Log-Transformed Statistics	
	Minimum		Minimum	
	Maximum		Maximum	
	Second Largest	44.5	Second Largest	3.795
	First Quartile		First Quartile	
	Median		Median	
1	Third Quartile		Third Quartile	
		17.93	Mean	
,	SD	10.64	SD	0.723
	Coefficient of Variation	0.594		
	Skewness	0.74		
1 0 1 1		Backgroup	nd Statistics	
		Dackgroui		
	Normal Distribution Test	T	Lognormal Distribution Test	
	Lilliefors Test Statistic		Lilliefors Test Statistic	
	Lilliefors Critical Value	0.0826	Lilliefors Critical Value	0.0826
	Data not Normal at 5% Significance Leve	l	Data not Lognormal at 5% Significance Lev	el
1 0 1 1				
1 0 1 1				
	Assuming Normal Distribution		Assuming Lognormal Distribution	
2 0 2 1	Assuming Normal Distribution	33.05	Assuming Lognormal Distribution	12 08
3 0 3 1	95% UTL with 90% Coverage		95% UTL with 90% Coverage	42.98
2 0 2 1	95% UTL with 90% Coverage 95% UPL (t)	35.65	95% UTL with 90% Coverage 95% UPL (t)	48.23
2 6 2 4	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	35.65 31.56	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	48.23 36.54
2 6 2 4	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	35.65 31.56 35.43	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	48.23 36.54 47.51
3 0 3 E	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	35.65 31.56 35.43	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	48.23 36.54 47.51
3 e 3 t 3 e 3 t 3 e 3 t 3 e 3 t 3 e 3 e 3 e 3 e	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	35.65 31.56 35.43	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	48.23 36.54 47.51
3 0 3 T	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	35.65 31.56 35.43	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	48.23 36.54 47.51
1	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Gamma Distribution Test	35.65 31.56 35.43 42.68	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	48.23 36.54 47.51 77.76
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star	35.65 31.56 35.43 42.68	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	48.23 36.54 47.51 77.76
3 * 3 * 3 * 3 * 3 * 3 * 3 * 3 * 3 * 3 *	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star	35.65 31.56 35.43 42.68 2.43 7.379	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	48.23 36.54 47.51 77.76
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean	35.65 31.56 35.43 42.68 2.43 7.379 17.93	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	48.23 36.54 47.51 77.76
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star	35.65 31.56 35.43 42.68 2.43 7.379 17.93	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	48.23 36.54 47.51 77.76
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	48.23 36.54 47.51 77.76
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	48.23 36.54 47.51 77.76
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance	48.23 36.54 47.51 77.76
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant	48.23 36.54 47.51 77.76
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.762	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile	48.23 36.54 47.51 77.76 <b>ce Level</b> 33.16
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.762 0.0766	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile 95% Percentile	48.23 36.54 47.51 77.76 <b>ce Level</b> 33.16 36.95
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.762 0.0766 0.0864	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile	48.23 36.54 47.51 77.76 <b>ce Level</b> 33.16 36.95
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.762 0.0766 0.0864	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile 95% Percentile	48.23 36.54 47.51 77.76 <b>ce Level</b> 33.16 36.95
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.762 0.0766 0.0864	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile 95% Percentile	48.23 36.54 47.51 77.76 <b>ce Level</b> 33.16 36.95
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.762 0.0766 0.0864	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile	48.23 36.54 47.51 77.76 <b>ce Level</b> 33.16 36.95 44.43
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 4 Star Example 1 Star Example 2 St	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.762 0.0766 0.0864 <b>ce Level</b>	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile	48.23 36.54 47.51 77.76 <b>ce Level</b> 33.16 36.95 44.43
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.762 0.0766 0.0864 <b>ce Level</b>	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile	48.23 36.54 47.51 77.76 <b>ce Level</b> 33.16 36.95 44.43 35.8 35.8
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 4 Star External Exter	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.762 0.0766 0.0864 <b>ce Level</b>	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage	48.23 36.54 47.51 77.76 <b>ce Level</b> 33.16 36.95 44.43 35.8 35.8 35.8
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.762 0.0766 0.0864 <b>ce Level</b>	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile 20 95% Percentile 99% Percentile 95% Perc	48.23 36.54 47.51 77.76 <b>ce Level</b> 33.16 36.95 44.43 35.8 35.8 35.8 38.82
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile 95% Percentile	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.0766 0.0864 <b>ce Level</b> 33.33 40.03 54.74	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile 20 95% Percentile 99% Percentile 95% Perc	48.23 36.54 47.51 77.76 <b>ce Level</b> 33.16 36.95 44.43 35.8 35.8 35.8 38.82 64.51
	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 4 Star External Exter	35.65 31.56 35.43 42.68 2.43 7.379 17.93 11.5 558.8 0.752 0.0766 0.0864 <b>ce Level</b> 33.33 40.03 54.74	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile 20 95% Percentile 99% Percentile 95% Perc	33.16 36.95 44.43 35.8 35.8 38.82 64.51

95% HW Approx. Gamma UPL % WH Approx. Gamma UTL with 90% Coverage % HW Approx. Gamma UTL with 90% Coverage  MG/KG MAGNESIUM  (br_na)  Total Number of Observations Tolerance Factor	37.15 38.13		
% WH Approx. Gamma UTL with 90% Coverage % HW Approx. Gamma UTL with 90% Coverage  MG/KG MAGNESIUM  (br_na)  Total Number of Observations	37.15 38.13		
% HW Approx. Gamma UTL with 90% Coverage  MG/KG MAGNESIUM  (br_na)  Total Number of Observations	38.13		
MG/KG MAGNESIUM  (br_na)  Total Number of Observations			
Total Number of Observations	General		
Total Number of Observations	General		
Total Number of Observations	General		
Total Number of Observations	General		
	General		
		Statistics	
Tolerance Factor	30	Number of Distinct Observations	30
	1.777		
Raw Statistics		Log-Transformed Statistics	
Minimum		Minimum	
Maximum		Maximum	
Second Largest	7830	Second Largest	
	-	SD	U.66
Skewness	-0.294		<u> </u>
	Backgrour	nd Statistics	
	Dackgroun		
	0.945		0.81
•			
Assuming Normal Distribution		Assuming Lognormal Distribution	
		95% UTL with 90% Coverage	13261
95% UPL (t)	8475	95% UPL (t)	12832
		90% Percentile (z)	
( )		. ,	
99% Percentile (z)	9756	99% Percentile (z)	19059
	0.004		
		Data appear Normal at 5% Significance Lev	'eı
Tiu Stat	100.0		
A-D Test Statistic	1.003	Nonparametric Statistics	
		•	7376
	-	95% Percentile	
		99% Percentile	
follow Appx. Gamma Distribution at 5% Signific	ance Leve		
Assuming Gamma Distribution		95% UTL with 90% Coverage	
99% Percentile	13246		
050/14/14	10101		
		Upper Threshold Limit Based upon IQR	12445
% HW Approx. Gamma UTL with 90% Coverage	10828		1
	Median Third Quartile Mean SD Coefficient of Variation Skewness  Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value follow Appx. Gamma Distribution 90% Percentile 95% Percentile 99% Percentile	Normal Distribution Test	Median

	, , , , , , , , , , , , , , , , , , , ,	h		r
, , , ,		General	Statistics	
, , , ,	Total Number of Observations	100	Number of Distinct Observations	85
	Tolerance Factor	1.524		
1 1 1	Raw Statistics		Log-Transformed Statistics	
	Minimum		Minimum	
	Maximum		Maximum	
	Second Largest		Second Largest	
	First Quartile		First Quartile	
	Median		Median	
	Third Quartile		Third Quartile	
	Mean	550.6	Mean	7.952 0.189
1 1 4	Coefficient of Variation		30	0.103
1 1 1	Skewness			
	OKCWIICSS	0.000		
1 1 4		Backgroun	d Statistics	
1 1 *	Normal Distribution Test		Lognormal Distribution Test	
	Lilliefors Test Statistic	0.0473	Lilliefors Test Statistic	0.0373
1 1 1	Lilliefors Critical Value	0.0886	Lilliefors Critical Value	
1 1 1	Data appear Normal at 5% Significance Lev	/el_	Data appear Lognormal at 5% Significance Le	evel
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)	41/3	99% Percentile (z)	4408
1 1 2	Gamma Distribution Test		Data Distribution Test	
	k star	27.66	Data appear Normal at 5% Significance Lev	ام
	Theta Star		Data appear Normal at 5% Significance Levi	CI
	MLE of Mean			
	MLE of Standard Deviation			
1 1 2	nu star			
	A-D Test Statistic	0.165	Nonparametric Statistics	
	5% A-D Critical Value	0.75	90% Percentile	3541
	K-S Test Statistic		95% Percentile	
	5% K-S Critical Value		99% Percentile	4511
	Data appear Gamma Distributed at 5% Significan	ce Level		
	Assemble to Oscillate Bladdle disc		050/ 1171 31 000/ 0	0000
	Assuming Gamma Distribution	2616	95% UTL with 90% Coverage	
1 1 2	90% Percentile 95% Percentile		95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage	
	99% Percentile		95% BCA Bootstrap OTE with 90% Coverage 95% UPL	
1 1 4	55 % F GICEITINE	1020	95% Chebyshev UPL	
1 4 0	95% WH Approx. Gamma UPL	3858	Upper Threshold Limit Based upon IQR	
	95% HW Approx. Gamma UPL		,,	
1 4 1	95% WH Approx. Gamma UTL with 90% Coverage			
1 4 3	95% HW Approx. Gamma UTL with 90% Coverage	3769		
	M MG/KG MAGNESIUM  (so_ss)			
		0	Chatlatian	
1 1 0	Niconhau of V-Ed Data		Statistics Number of Detected Data	110
	Number of Valid Data  Number of Distinct Detected Data		Number of Detected Data  Number of Non-Detect Data	
1 1 1	Number of Distinct Detected Data  Tolerance Factor		Number of Non-Detect Data Percent Non-Detects	
1 1 1	i dierance Factor	1.500	Fercent Non-Detects	7.00%
1 1 1	Raw Statistics		Log-transformed Statistics	
1 1 1	Minimum Detected	555	Minimum Detected	6 319
1 2 4	Maximum Detected		Maximum Detected	
	Maximum Detected		Maximum Detected	

3 3	Y 8 6 9 8	1		
	Mean of Detected	1727	Mean of Detected	7 /17
		-		
	SD of Detected		SD of Detected	
	Minimum Non-Detect		Minimum Non-Detect	
٠	Maximum Non-Detect	1380	Maximum Non-Detect	7.23
1				
1	Data with Multiple Detection Limits		Single Detection Limit Scenario	
1	Note: Data have multiple DLs - Use of KM Method is	recommen	Number treated as Non-Detect with Single DL	26
*	For all methods (except KM, DL/2, and ROS Methods	s),	Number treated as Detected with Single DL	89
,	Observations < Largest ND are treated as NDs	,-	Single DL Non-Detect Percentage	
٠				
ı		Backgroun	d Statistics	
*	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	s Only
	Lilliefors Test Statistic		Lilliefors Test Statistic	
٠	5% Lilliefors Critical Value		5% Lilliefors Critical Value	
,	Data appear Normal at 5% Significance Lev		Data not Lognormal at 5% Significance Lev	
,	Data appear Normal at 5 % Significance Lev	/ <del>C</del> I	Data not Lognormal at 5% Significance Lev	<del> </del>
7	A No		A	
·	Assuming Normal Distribution		Assuming Lognormal Distribution	
	DL/2 Substitution Method		DL/2 Substitution Method	
*	Mean		Mean (Log Scale)	
*		530.5	SD (Log Scale)	
3	95% UTL 90% Coverage	2486	95% UTL 90% Coverage	2767
*	95% UPL (t)	2571	95% UPL (t)	2934
٠	90% Percentile (z)	2367	90% Percentile (z)	2548
٠	95% Percentile (z)		95% Percentile (z)	
,	99% Percentile (z)		99% Percentile (z)	
3	5575 : 5.557,4110 (2)		5575 : 5.557.4110 (2)	
¥	Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
,	Mean Mean		Mean in Original Scale	1707
		486.8	SD in Original Scale	
,			-	
1	95% UTL with 90% Coverage	2450	95% UTL with 90% Coverage	
			95% BCA UTL with 90% Coverage	
			95% Bootstrap (%) UTL with 90% Coverage	2510
	95% UPL (t)		95% UPL (t)	2752
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)	2518	95% Percentile (z)	2734
1		2518		2734
1	95% Percentile (z) 99% Percentile (z)	2518 2850	95% Percentile (z)	2734
1	95% Percentile (z)	2518 2850	95% Percentile (z)	2734 3388
	95% Percentile (z) 99% Percentile (z)	2518 2850 Only	95% Percentile (z) 99% Percentile (z)	2734 3388 Only
1 1	95% Percentile (z) 99% Percentile (z) Gamma Distribution Test with Detected Values	2518 2850 <b>Only</b> 11.47	95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (	2734 3388 Only
7 7	95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected)	2518 2850 S Only 11.47 151.4	95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (	2734 3388 Only
7 T	95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values  k star (bias corrected)  Theta Star	2518 2850 S Only 11.47 151.4	95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (	2734 3388 Only
7 T	95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values  k star (bias corrected)  Theta Star	2518 2850 <b>S Only</b> 11.47 151.4 2524	95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values O  Data appear Normal at 5% Significance Leve	2734 3388 Only
7 Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic	2518 2850 3 Only 11.47 151.4 2524 0.739	95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C  Data appear Normal at 5% Significance Leve	2734 3388 Only
T T T T T T T T T T T T T T T T T T T	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value	2518 2850 3 Only 11.47 151.4 2524 0.739 0.752	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values ( Data appear Normal at 5% Significance Level  Nonparametric Statistics  Kaplan-Meier (KM) Method	2734 3388 <b>Only</b> el
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values ( Data appear Normal at 5% Significance Level  Nonparametric Statistics  Kaplan-Meier (KM) Method Mean	2734 3388 <b>Dnly</b> el
1 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896 0.0868	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values ( Data appear Normal at 5% Significance Level  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD	2734 3388 Only el 1702 502.6
1	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896 0.0868	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values ( Data appear Normal at 5% Significance Level  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean	2734 3388 Only el 1702 502.6 47.22
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Signific	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896 0.0868	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (c)  Data appear Normal at 5% Significance Level  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage	2734 3388 Only el 1702 502.6 47.22 2459
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution  Assuming Gamma Distribution	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896 0.0868	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values ( Data appear Normal at 5% Significance Level  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL	2734 3388 Only el 1702 502.6 47.22 2459 3902
7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution Gamma ROS Statistics with Extrapolated Data	2518 2850 3 Only 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 cance Leve	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C Data appear Normal at 5% Significance Leve  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t)	2734 3388 Dnly el 1702 502.6 47.22 2459 3902 2539
1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Signification Gamma ROS Statistics with Extrapolated Data Mean	2518 2850 3 Only 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C Data appear Normal at 5% Significance Leve  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z)	2734 3388 Dnly el 1702 502.6 47.22 2459 3902 2539 2346
* * * * * * * * * * * * * * * * * * *	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C Data appear Normal at 5% Significance Leve  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z)	2734 3388 Only el 1702 502.6 47.22 2459 3902 2539 2346 2529
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD	2518 2850 3 Only 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C Data appear Normal at 5% Significance Leve  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z)	2734 3388 Only el 1702 502.6 47.22 2459 3902 2539 2346 2529
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (c)  Data appear Normal at 5% Significance Level  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z)	2734 3388 Only el 1702 502.6 47.22 2459 3902 2539 2346 2529 2871
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C Data appear Normal at 5% Significance Leve  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z)	2734 3388 Only el 1702 502.6 47.22 2459 3902 2539 2346 2529 2871
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values O Data appear Normal at 5% Significance Levi  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)	2734 3388 Dnly el 1702 502.6 47.22 2459 3902 2539 2871 a 2678
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values O Data appear Normal at 5% Significance Levi  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)	2734 3388 Dnly el 1702 502.6 47.22 2459 3902 2539 2871 a 2678
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve 1700 1670 508.3 9.962 170.6 2291 31.31	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (c)  Data appear Normal at 5% Significance Level  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL	2734 3388 Dnly el 1702 502.6 47.22 2459 3902 2539 2346 2529 2871 a 2678 2704
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star	2518 2850 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve 1700 1670 508.3 9.962 170.6 2291 31.31	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values Of Data appear Normal at 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data	2734 3388 Dnly el 1702 502.6 47.22 2459 3902 2539 2871 2678 2678 2704 2564
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	2518 2850 3 Only 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve 1700 1670 508.3 9.962 170.6 2291 31.31	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (c)  Data appear Normal at 5% Significance Level  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL	2734 3388 Dnly el 1702 502.6 47.22 2459 3902 2539 2871 2678 2678 2704 2564
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	2518 2850 3 Only 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve 1700 1670 508.3 9.962 170.6 2291 31.31	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values Of Data appear Normal at 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data	2734 3388 Dnly el 1702 502.6 47.22 2459 3902 2539 2871 2678 2678 2704 2564
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	2518 2850 3 Only 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve 1700 1670 508.3 9.962 170.6 2291 31.31	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values Of Data appear Normal at 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data	2734 3388 Dnly el 1702 502.6 47.22 2459 3902 2539 2346 2529 2871 a 2678 2704 2564
	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data follow Appx. Gamma Distribution at 5% Significe  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	2518 2850 3 Only 11.47 151.4 2524 0.739 0.752 0.0896 0.0868 ance Leve 1700 1670 508.3 9.962 170.6 2291 31.31	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values Of Data appear Normal at 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data appear Normal At 5% Significance Levin Data	2734 3388 Dnly el 1702 502.6 47.22 2459 3902 2539 2346 2529 2871 a 2678 2704 2564

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,	M MG/KG MANGANESE  (br_na)			
7	1 1 1 1 1 1			
			Statistics	
	Total Number of Observations		Number of Distinct Observations	30
1	Tolerance Factor	1.///		
	Daw Otatistics		Law Transformed Obsticking	
	Raw Statistics Minimum	12.0	Log-Transformed Statistics Minimum	2 621
	Maximum		Maximum	
	Second Largest		Second Largest	
3	First Quartile		First Quartile	
_	Median		Median	
-	Third Quartile		Third Quartile	
		716.7	Mean	
		969.7		1.33
	Coefficient of Variation	1.353		
	Skewness	2.312		
		Backgrour	nd Statistics	
1	Normal Distribution Test	•	Lognormal Distribution Test	
	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
	Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
	Data not Normal at 5% Significance Leve	İ	Data appear Lognormal at 5% Significance Le	evel
	Assuming Normal Distribution		Assuming Lognormal Distribution	
Ħ	95% UTL with 90% Coverage	2440	95% UTL with 90% Coverage	3678
-	95% UPL (t)		95% UPL (t)	
1	90% Percentile (z)		90% Percentile (z)	
1	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)		99% Percentile (z)	
	( )		(7)	
	Gamma Distribution Test		Data Distribution Test	
	k star	0.742	Data appear Lognormal at 5% Significance Le	evel
	Theta Star	966 1		
	MLE of Mean	716.7		
	MLE of Mean MLE of Standard Deviation	716.7 832.1		
	MLE of Mean	716.7 832.1		
	MLE of Mean MLE of Standard Deviation nu star	716.7 832.1 44.51	Name and the Obstitution	
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic	716.7 832.1 44.51	Nonparametric Statistics	1690
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value	716.7 832.1 44.51 0.95 0.785	90% Percentile	
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	716.7 832.1 44.51 0.95 0.785 0.193	90% Percentile 95% Percentile	2902
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value	716.7 832.1 44.51 0.95 0.785 0.193 0.166	90% Percentile	2902
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance	716.7 832.1 44.51 0.95 0.785 0.193 0.166	90% Percentile 95% Percentile 99% Percentile	2902 3787
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>Exercise</b>	90% Percentile 95% Percentile 99% Percentile 99% Percentile	2902 3787 3680
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>Exercise</b>	90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage	2902 3787 3680 3695
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>Exercise</b>	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage	2902 3787 3680 3695 3695
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>Exercise</b>	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL	2902 3787 3680 3695 3695 3748
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>ELEVEL</b> 1775 2389 3849	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	3680 3695 3695 3748 5014
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>ELEVEL</b> 1775 2389 3849	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL	2902 3787 3680 3695 3695 3748 5014
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>ELEVEL</b> 1775 2389 3849	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	2902 3787 3680 3695 3695 3748 5014
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>ELEVEL</b> 1775 2389 3849	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	2902 3787 3680 3695 3695 3748 5014
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>ELEVEL</b> 1775 2389 3849	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	2902 3787 3680 3695 3695 3748 5014
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>ELEVEL</b> 1775 2389 3849	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	3680 3695 3695 3748 5014
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>ELEVEL</b> 1775 2389 3849	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	3680 3695 3695 3748 5014
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>ELEVEL</b> 1775 2389 3849 2371 2467 2459 2570	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	2902 3787 3680 3695 3695 3748 5014 1212
	MLE of Mean  MLE of Standard Deviation  nu star  A-D Test Statistic  5% A-D Critical Value  K-S Test Statistic  5% K-S Critical Value  Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UTL  95% HW Approx. Gamma UTL  90% Coverage  95% HW Approx. Gamma UTL with  90% Coverage	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>b. Level</b> 1775 2389 3849 2371 2467 2459 2570	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	2902 3787 3680 3695 3695 3748 5014 1212
	MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>b. Level</b> 1775 2389 3849 2371 2467 2459 2570	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	2902 3787 3680 3695 3695 3748 5014 1212
	MLE of Mean  MLE of Standard Deviation  nu star  A-D Test Statistic  5% A-D Critical Value  K-S Test Statistic  5% K-S Critical Value  Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution  90% Percentile  95% Percentile  99% Percentile  99% Percentile  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UTL  95% HW Approx. Gamma UTL  90% Coverage  95% HW Approx. Gamma UTL with  90% Coverage	716.7 832.1 44.51 0.95 0.785 0.193 0.166 <b>b. Level</b> 1775 2389 3849 2371 2467 2459 2570	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	2902 3787 3680 3695 3695 3748 5014 1212

	Y F C D I			,
	Minimum	157	NA:i	E 0E0
1 1 0 1	Minimum	_	Minimum	
	Maximum		Maximum	
	Second Largest		Second Largest	
	First Quartile		First Quartile	
	Median		Median	
	Third Quartile	-	Third Quartile	
		423.8	Mean	
1 1 1	SD	277.6	SD	0.488
1 1 1	Coefficient of Variation	0.655		
	Skewness	2.679		
1 1 4		Backgroun	d Statistics	
1 1 1	Normal Distribution Test		Lognormal Distribution Test	
	Lilliefors Test Statistic	0.194	Lilliefors Test Statistic	0.0988
1 1 4	Lilliefors Critical Value	0.0886	Lilliefors Critical Value	0.0886
1 1 0	Data not Normal at 5% Significance Leve		Data not Lognormal at 5% Significance Lev	
		-		
1 1 1	Assuming Normal Distribution		Assuming Lognormal Distribution	
1 1 1	95% UTL with 90% Coverage	846 9	95% UTL with 90% Coverage	777
1 1 1	95% UPL (t)		95% UPL (t)	
7 7 7	90% Percentile (z)		90% Percentile (z)	
1 1 4	95% Percentile (z)		95% Percentile (z)	
1 1 1				
1 1 1	99% Percentile (z)	10/0	99% Percentile (z)	1150
1 1 4	O-man - Bi-talbartian Tast		Data Distribution Tast	
	Gamma Distribution Test k star	0.070	Data Distribution Test	0.05\
	1		Data do not follow a Discernable Distribution (	0.05)
	Theta Star	_		ı
	MLE of Mean			
	MLE of Standard Deviation			
	nu star	734.5		
1 1 1				
	A-D Test Statistic		Nonparametric Statistics	
1 1 1	5% A-D Critical Value		90% Percentile	
	K-S Test Statistic	0.126	95% Percentile	984
	5% K-S Critical Value		99% Percentile	1522
	Data not Gamma Distributed at 5% Significance	e Level		
	Assuming Gamma Distribution		95% UTL with 90% Coverage	
	90% Percentile	720.3	95% Percentile Bootstrap UTL with 90% Coverage	863.1
2 4 4	95% Percentile	840.6	95% BCA Bootstrap UTL with 90% Coverage	863.1
	99% Percentile	1099	95% UPL	1037
			95% Chebyshev UPL	1640
1 4 1	95% WH Approx. Gamma UPL	837.2	Upper Threshold Limit Based upon IQR	
	95% HW Approx. Gamma UPL		11 11 11 11 11 11 11 11 11	
1 1 0	95% WH Approx. Gamma UTL with 90% Coverage			
1 1 0	95% HW Approx. Gamma UTL with 90% Coverage			
1 ( )	oo /o 11117 (pprox.: damma o 12 mai - oo /o covorage	701.0		
1 1 1				
1 1 1				
1 1 1	M MG/KG MANGANESE  (so_ss)			
	1\/			
		General	Statistics	
1 1 1	Total Number of Observations		Number of Distinct Observations	100
	Tolerance Factor			
		1		I
	Raw Statistics		Log-Transformed Statistics	
1 * *		27.9	Minimum	3.329
7 4 9				
1 4 1	Minimum		Mavimim	
1	Minimum Maximum	477	Maximum Second Largest	
2 4 0 2 4 1 2 4 2 2 4 2	Minimum Maximum Second Largest	477 454	Second Largest	6.118
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Minimum Maximum Second Largest First Quartile	477 454 102.5	Second Largest First Quartile	6.118 4.63
1	Minimum Maximum Second Largest First Quartile Median	477 454 102.5 136	Second Largest First Quartile Median	6.118 4.63 4.913
1 * * * 1 1 * 1 1 * 1 1 * 1 1 * 1 1 * 1	Minimum Maximum Second Largest First Quartile Median Third Quartile	477 454 102.5 136 197	Second Largest First Quartile Median Third Quartile	6.118 4.63 4.913 5.283
1	Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	477 454 102.5 136	Second Largest First Quartile Median Third Quartile Mean	6.118 4.63 4.913 5.283

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ı	Coefficient of Variation	0.550	<del>                                     </del>	
3 0	Skewness			
3 1	Skewness	1.37		
1 1		Dookarous	ad Statistics	
1 7		Backgroui	nd Statistics	
3 1	Normal Distribution Test  Lilliefors Test Statistic	0 1 4 4	Lognormal Distribution Test  Lilliefors Test Statistic	0.0555
2 1				
3 4	Lilliefors Critical Value		Lilliefors Critical Value	
1 1	Data not Normal at 5% Significance Leve	l	Data appear Lognormal at 5% Significance Lo	evei
1 Y	Accoming Named Distribution		Accompliant Company of Distribution	
1 0	Assuming Normal Distribution	205.1	Assuming Lognormal Distribution 95% UTL with 90% Coverage	220.0
	95% UTL with 90% Coverage 95% UPL (t)	310.0	95% UTL With 90% Coverage 95% UPL (t)	
	95% OPE (t) 90% Percentile (z)		95% OPL (t) 90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)		95% Percentile (z)	
	99% Percentile (2)	301.1	99% Percentile (2)	495.5
	Oomana Distribution Tool		Date Dietrikusien Teet	
	Gamma Distribution Test	2 CEE	Data Distribution Test  Data appear Lognormal at 5% Significance Lognormal	ovel
F 3	k star Theta Star		Data appear Lognormal at 5% Significance Lo	evei .
	neta Star MLE of Mean			
	MLE of Mean  MLE of Standard Deviation			
	MLE of Standard Deviation nu star			
	nu star	040.0		
* 1	A-D Test Statistic	0 021	Nonparametric Statistics	
* 7	5% A-D Critical Value		90% Percentile	202 6
	K-S Test Statistic		95% Percentile	
	5% K-S Critical Value		99% Percentile	
	Data not Gamma Distributed at 5% Significance		55 % Fercentile	431.1
# 1	Data not Gamma Distributed at 5% Significance	LEVE		
	Assuming Gamma Distribution		95% UTL with 90% Coverage	3/12
	90% Percentile	201.0	95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
	99% Percentile		95% BCA Bootstrap OTE with 90% Coverage 95% UPL	
* 1	55 % Fercentile	430.1	95% Chebyshev UPL	
0 7	95% WH Approx. Gamma UPL	330.3	Upper Threshold Limit Based upon IQR	
	95% HW Approx. Gamma UPL		Opper Threshold Limit based upon IQIT	330.0
	95% WH Approx. Gamma UTL with 90% Coverage			
	95% HW Approx. Gamma UTL with 90% Coverage			
* 1		10.00		
	1			
	M MG/KG MERCURY  (br_na)			
			Statistics	
1 1	Number of Valid Data	30	Number of Detected Data	
		30		
	Number of Valid Data Number of Distinct Detected Data	30 0	Number of Detected Data Number of Non-Detect Data	30
* * * * * * * * * * * * * * * * * * *	Number of Valid Data Number of Distinct Detected Data Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and	30 0 (NDs), the other stat	Number of Detected Data	30 os! imit!
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Number of Valid Data  Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site	(NDs), the other states specific	Number of Detected Data  Number of Non-Detect Data  Perefore all statistics and estimates should also be ND istics are also NDs lying below the largest detection I values to estimate environmental parameters (e.g., E	30 es! imit!
	Number of Valid Data  Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site	(NDs), the other states specific	Number of Detected Data Number of Non-Detect Data Prefore all statistics and estimates should also be ND Noted that is the statistics and estimates should also be ND Noted that is the statistics are also NDs lying below the largest detection I	30 es! imit!
	Number of Valid Data  Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site	(NDs), the other states specific	Number of Detected Data  Number of Non-Detect Data  Perefore all statistics and estimates should also be ND istics are also NDs lying below the largest detection I values to estimate environmental parameters (e.g., E	30 es! imit!
	Number of Valid Data Number of Distinct Detected Data Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site The data set for variable M	(NDs), the other state specific MG/KG M	Number of Detected Data  Number of Non-Detect Data  Number of Non-Detect Data  Perefore all statistics and estimates should also be ND  istics are also NDs lying below the largest detection I  values to estimate environmental parameters (e.g., E  IERCURY  (br_na) was not processed!	30 os! imit!
	Number of Valid Data Number of Distinct Detected Data Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site The data set for variable M	(NDs), the other state specific MG/KG M	Number of Detected Data  Number of Non-Detect Data  Number of Non-Detect Data  Perefore all statistics and estimates should also be ND  istics are also NDs lying below the largest detection I  values to estimate environmental parameters (e.g., E  IERCURY  (br_na) was not processed!	30 os! imit! PC, BT
	Number of Valid Data Number of Distinct Detected Data Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site The data set for variable M	(NDs), the other state specific MG/KG M	Number of Detected Data  Number of Non-Detect Data  Number of Non-Detect Data  Perefore all statistics and estimates should also be ND  istics are also NDs lying below the largest detection I  values to estimate environmental parameters (e.g., E  IERCURY  (br_na) was not processed!  Statistics  Number of Detected Data	30 Ps! imit! PC, BT
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M  M MG/KG MERCURY  (so_sb)  Number of Valid Data Number of Distinct Detected Data	(NDs), the other state specific MG/KG M	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND istics are also NDs lying below the largest detection I values to estimate environmental parameters (e.g., E IERCURY  (br_na) was not processed!  Statistics  Number of Detected Data Number of Non-Detect Data	30 PS! Imit! PC, BT  5 95
	Number of Valid Data Number of Distinct Detected Data Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site The data set for variable M	(NDs), the other state specific MG/KG M	Number of Detected Data  Number of Non-Detect Data  Number of Non-Detect Data  Perefore all statistics and estimates should also be ND  istics are also NDs lying below the largest detection I  values to estimate environmental parameters (e.g., E  IERCURY  (br_na) was not processed!  Statistics  Number of Detected Data	30 PS! Imit! PC, BT  5 95
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M  M MG/KG MERCURY  (so_sb)  Number of Valid Data Number of Distinct Detected Data	(NDs), the other state specific MG/KG M	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND istics are also NDs lying below the largest detection I values to estimate environmental parameters (e.g., E IERCURY  (br_na) was not processed!  Statistics  Number of Detected Data Number of Non-Detect Data	30 PS! Imit! PC, BT  5 95

	у в с р т	,	g 8 1 1 1 E	r
, , , ,	Maximum Detected		Maximum Detected	
	Mean of Detected		Mean of Detected	
	SD of Detected		SD of Detected	
, , , ,	Minimum Non-Detect	0.011	Minimum Non-Detect	-4.51
1 1 1 1	Maximum Non-Detect	0.02	Maximum Non-Detect	-3.912
2 1 2 4	Data with Multiple Detection Limits	1	Single Detection Limit Scenario	
2 1 1 0	Note: Data have multiple DLs - Use of KM Method is	recommen		98
	For all methods (except KM, DL/2, and ROS Methods		Number treated as Detected with Single DL	
	Observations < Largest ND are treated as NDs	5),	Single DL Non-Detect Percentage	
	Observations - Largest ND are treated as NDs		Single DE Non-Detect i ercentage	30.00 /0
	Worning, Thoro	oro only E	Detected Values in this data	
			Detected Values in this data	
			pootstrap may be performed on this data set	
2 1 1 1	the resulting calculations i	may not be	reliable enough to draw conclusions	
	It is recommended to have 10-15 or mo	ore distinct	observations for accurate and meaningful results.	
2 1 1 1		Backgroun	d Statistics	
2 1 1 2	Normal Distribution Test with Detected Values	Only	Lognormal Distribution Test with Detected Value	s Only
2 1 1 7	Shapiro Wilk Test Statistic	0.964	Shapiro Wilk Test Statistic	0.961
	5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
2 1 1 1	Data appear Normal at 5% Significance Lev		Data appear Lognormal at 5% Significance Lo	
	2 dia appear (10/11/a) at 0/0 0/g/11/104/100 201		Data appear logrormar at 0 /0 org.mioanico l	
2 1 1 3	Assuming Normal Distribution		Assuming Lognormal Distribution	
	DL/2 Substitution Method		DL/2 Substitution Method	
		0.00748	Mean (Log Scale)	4.020
2 1 1 1		0.00257	SD (Log Scale)	
	95% UTL 90% Coverage		95% UTL 90% Coverage	
	95% UPL (t)		95% UPL (t)	
, , , ,	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	0.0105
	99% Percentile (z)	0.0135	99% Percentile (z)	0.0123
3 1 4 4				
2 4 4 3	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
2 4 4 X	,		Mean in Original Scale	0.00599
			SD in Original Scale	
2 1 2 0			Mean in Log Scale	
5 4 3 1			SD in Log Scale	
2 7 2 2			95% UTL 90% Coverage	
			95% UPL (t)	
3 7 3 7				
2 1 2 1			90% Percentile (z)	
1 1 1 1			95% Percentile (z)	
			99% Percentile (z)	0.01/5
, , , ,	Gamma Distribution Test with Detected Values		Data Distribution Test with Detected Values (	
1 1 1 0	k star (bias corrected)		Data appear Normal at 5% Significance Leve	el
	Theta Star			
, , , ,	nu star	118.8		
1 1 1 1				
1 1 1 1	A-D Test Statistic	0.236	Nonparametric Statistics	
, , , ,	5% A-D Critical Value		Kaplan-Meier (KM) Method	
, , , ,	K-S Test Statistic		. , ,	0.0132
	5% K-S Critical Value			0.00125
1 1 1 1	Data appear Gamma Distributed at 5% Significan		SE of Mean	
, , , ,	Tata appear damina biotributed at 0% digitilledit	22 20101	95% KM UTL with 90% Coverage	
2 1 1 4	Assuming Commo Distribution	1	95% KM Chebyshev UPL	
	Assuming Gamma Distribution			
	Gamma ROS Statistics with Extrapolated Data	0.00000	95% KM UPL (t)	
, , , ,			90% Percentile (z)	U.0148
2 1 4 1	Mean			
, , , ,	Mean Median	1E-06	95% Percentile (z)	0.0153
2 T # 2	Mean Median SD	1E-06 0.00399		0.0153
2 7 4 2	Mean Median SD k star	1E-06 0.00399 0.13	95% Percentile (z)	0.0153
2 1 4 2	Mean Median SD	1E-06 0.00399 0.13	95% Percentile (z)	0.0153 0.0162

	y 1 C D - 1	1	0 K 1 1 K	,
2 4 4 3	050/ Danagatila of Okia 2002 (21)	1 400	OFO( Handina Miday (HM) Ammay Oamaa HDI	0.00100
	95% Percentile of Chisquare (2k)		95% Hawkins Wixley (HW) Approx. Gamma UPL	
			95% WH Approx. Gamma UTL with 90% Coverage	
	90% Percentile	0.00288	95% HW Approx. Gamma UTL with 90% Coverage	0.00096
	95% Percentile	0.00561		
	99% Percentile	0.0138		
2 1 0 2				
	Note: DL/2 is not a recommended method			
2 1 0 1	Note: DL/2 is not a recommended method.			
, , , ,				
2 1 1 1	M MG/KG MERCURY  (so_ss)			
2 4 4 1	., _ ,			
		General	Statistics	
	Number of Valid Data		Number of Detected Data	66
	Number of Distinct Detected Data		Number of Non-Detect Data	
	Tolerance Factor	1.506	Percent Non-Detects	42.61%
1 1 1 1	Raw Statistics		Log-transformed Statistics	
1 1 1 1	Minimum Detected	0.016	Minimum Detected	-4.135
	Maximum Detected	0.68	Maximum Detected	-0.386
1 1 1 1	Mean of Detected		Mean of Detected	
1 1 1 1	SD of Detected		SD of Detected	
	Minimum Non-Detect		Minimum Non-Detect	
	Maximum Non-Detect	0.22	Maximum Non-Detect	-1.514
1 1 1 0				
	Data with Multiple Detection Limits		Single Detection Limit Scenario	
2 1 2 2	Note: Data have multiple DLs - Use of KM Method is	recommen		112
	For all methods (except KM, DL/2, and ROS Methods		Number treated as Detected with Single DL	
		9),		
2 1 2 1	Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	97.39%
, , , ,		Backgroun	d Statistics	
	Normal Distribution Test with Detected Values	Only	Lognormal Distribution Test with Detected Value	s Only
	Lilliefors Test Statistic	0.272	Lilliefors Test Statistic	0.158
	5% Lilliefors Critical Value	0.109	5% Lilliefors Critical Value	
1 1 1 0	Data not Normal at 5% Significance Leve			
2 4 2 1	Data not Normal at 5% Significance Leve		Data not Lognormal at 5% Significance Lev	
2 1 2 1			Data not Lognormal at 5% Significance Lev	
2 1 2 2	Assuming Normal Distribution	İ	Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution	
2 4 2 2	Assuming Normal Distribution DL/2 Substitution Method		Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method	el
	Assuming Normal Distribution  DL/2 Substitution Method  Mean	0.0543	Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)	-3.353
2	Assuming Normal Distribution  DL/2 Substitution Method  Mean		Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method	-3.353
2 1 2 7 2 7 2 1 2 1 2 1 2 1 2 1 2 1 2 1	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD	0.0543 0.0739	Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)	-3.353 0.93
2 1 1 1 2 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage	0.0543 0.0739 0.166	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage	-3.353 0.93 0.142
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)	0.0543 0.0739 0.166 0.177	Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)	-3.353 0.93 0.142 0.165
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	-3.353 0.93 0.142 0.165 0.115
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	-3.353 0.93 0.142 0.165 0.115 0.162
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	-3.353 0.93 0.142 0.165 0.115 0.162
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  99% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  99% Percentile (z)	-3.353 0.93 0.142 0.165 0.115 0.162
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  99% Percentile (z)  Log ROS Method	-3.353 0.93 0.142 0.165 0.115 0.162 0.305
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  Log ROS Method  Mean in Original Scale	-3.353 0.93 0.142 0.165 0.115 0.162 0.305
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean	0.0543 0.0739 0.166 0.177 0.149 0.176	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  99% Percentile (z)  Log ROS Method	-3.353 0.93 0.142 0.165 0.115 0.162 0.305
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale	-3.353 0.93 0.142 0.165 0.115 0.162 0.305
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  109% Percentile (z)  95% Percentile (z)  95% Degree (z)  109% Percentile (z)  95% Degree (z)  109% Percentile (z)  109% Percentile (z)  109% Percentile (z)  109% Percentile (z)  109% Percentile (z)	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.05 0.0741 0.115
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  10	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  10	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  10	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  99% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  95% UTL with 90% Coverage  95% BCA UTL with 90% Coverage  95% BOC Coverage  95% UPL (t)  90% Percentile (z)	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  10	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  99% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  95% UTL with 90% Coverage  95% BCA UTL with 90% Coverage  95% BOC Coverage  95% UPL (t)  90% Percentile (z)	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132 0.0954 0.129
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  95% UTL with 90% Coverage  95% BCA UTL with 90% Coverage  95% BOC Overage  95% UPL (t)  90% Percentile (z)	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132 0.0954 0.129
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834 0.867 0.789 0.862 1.001	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  95% UTL with 90% Coverage  95% BCA UTL with 90% Coverage  95% BCA UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132 0.0954 0.129 0.229
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834 0.867 0.789 0.862 1.001	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  10	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132 0.0954 0.129 0.229
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834 0.867 0.789 0.862 1.001	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  95% UTL with 90% Coverage  95% BCA UTL with 90% Coverage  95% BCA UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132 0.0954 0.129 0.229
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  100 Percentile (z)  95% Percentile (z)  95% Percentile (z)  100 Percentile (z)  100 Percentile (z)  100 Percentile (z)  100 Percentile (z)  100 Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834 0.867 0.789 0.862 1.001	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  10	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132 0.0954 0.229
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834 0.867 0.789 0.862 1.001	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  10	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132 0.0954 0.229
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  100 Percentile (z)  95% Percentile (z)  95% Percentile (z)  100 Percentile (z)  100 Percentile (z)  100 Percentile (z)  100 Percentile (z)  100 Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834 0.867 0.789 0.862 1.001	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  10	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132 0.0954 0.129 0.229
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  100 Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834 0.867 0.789 0.862 1.001 5 Only 1.47 0.0489 194 2.684	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  10	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132 0.0954 0.129 0.229
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  100 Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834 0.867 0.789 0.862 1.001 5 Only 1.47 0.0489 194 2.684	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  SD in Original Scale  95% UTL with 90% Coverage  95% BCA UTL with 90% Coverage  95% BCA UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132 0.0954 0.129 0.229
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  195% Percentile (z)  95% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)  100% Percentile (z)	0.0543 0.0739 0.166 0.177 0.149 0.176 0.226 0.529 0.203 0.834 0.867 0.789 0.862 1.001 3 Only 1.47 0.0489 194 2.684 0.769	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  SD in Original Scale  SD in Original Scale  SD in Original Scale  95% BCA UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  95% UTL with 90% Coverage  95% BCA UTL with 90% Coverage  95% BPC UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  Data Distribution Test with Detected Values C  Data do not follow a Discernable Distribution (0)  Nonparametric Statistics  Kaplan-Meier (KM) Method	-3.353 0.93 0.142 0.165 0.115 0.162 0.305 0.0741 0.115 0.13 0.132 0.132 0.0954 0.129 0.229

	Y F C D 1	,		
_	5% K-S Critical Value	0.112	SD	0.0734
. 1	Data not Gamma Distributed at 5% Significance		SE of Mean	
4 7	Data not danima Distributed at 575 Org. initiality		95% KM UTL with 90% Coverage	
4 1	Assuming Gamma Distribution		95% KM Chebyshev UPL	
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
		0.0477	90% Percentile (z)	
e 3	Median		95% Percentile (z)	
* x		0.026	99% Percentile (z)	
	k star		99 % Fercentile (2)	0.223
1 0	Theta star		Gamma ROS Limits with Extrapolated Dat	
2 1	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	
1 1	95% Percentile of Chisquare (2k)		95% Wilson Hillerty (WH) Approx. Gamma UPL	
1 7	95% Percentile of Chisquare (2k)	2.747	95% WH Approx. Gamma UTL with 90% Coverage	
3 1	90% Percentile	0 1 4 1	95% HW Approx. Gamma UTL with 90% Coverage	
3 1	95% Percentile		95% HW Approx. Gamma OTL with 90% Coverage	0.194
3 4		-		
1 1	99% Percentile	0.419		
2 F	N . B(0)			
3 *	Note: DL/2 is not a recommended method.			
	MINO (KONIOKELI (h			
. ,	M MG/KG NICKEL  (br_na)			
		0	Os-st-st-	
	T. IN 1 (0)		Statistics	00
	Total Number of Observations		Number of Distinct Observations	30
	Tolerance Factor	1.777		
	Raw Statistics	I	Log-Transformed Statistics	
	Minimum		Minimum	
	Maximum	-	Maximum	
	Second Largest		Second Largest	
	First Quartile		First Quartile	2.607
. 1	Median	22.35	Median	3.106
* 1	Third Quartile	33.28	Third Quartile	3.504
	Mean	24.14	Mean	2.985
	SD	12.78	SD	0.778
	Coefficient of Variation	0.529		
* 1	Skewness			
		Backgrour	nd Statistics	
	<del>-</del>			
			Lognormal Distribution Test	
	Normal Distribution Test	0 974	Lognormal Distribution Test Shapiro Wilk Test Statistic	0.826
	Normal Distribution Test Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value	0.927	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value	0.927
	Normal Distribution Test Shapiro Wilk Test Statistic	0.927	Shapiro Wilk Test Statistic	0.927
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev	0.927	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev	0.927
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev Assuming Normal Distribution	0.927 <b>/el</b>	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev Assuming Lognormal Distribution	0.927 el
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage	0.927 <b>/el</b> 46.85	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage	0.927 <b>el</b> 78.89
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t)	0.927 /el 46.85 46.21	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution 95% UTL with 90% Coverage 95% UPL (t)	0.927 el 78.89 75.89
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	0.927 /el 46.85 46.21 40.52	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	78.89 75.89 53.66
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	0.927 /el 46.85 46.21 40.52 45.16	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	78.89 75.89 53.66 71.18
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	0.927 /el 46.85 46.21 40.52 45.16	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	78.89 75.89 53.66 71.18
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	0.927 /el 46.85 46.21 40.52 45.16	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	78.89 75.89 53.66 71.18
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	0.927 /el  46.85 46.21 40.52 45.16 53.87	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	78.89 75.89 53.66 71.18
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star	0.927 /el  46.85 46.21 40.52 45.16 53.87	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	78.89 75.89 53.66 71.18
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star	0.927 /el  46.85 46.21 40.52 45.16 53.87  2.43 9.935	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	78.89 75.89 53.66 71.18
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean	0.927 /el  46.85 46.21 40.52 45.16 53.87  2.43 9.935 24.14	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	78.89 75.89 53.66 71.18
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation	0.927 /el 46.85 46.21 40.52 45.16 53.87 2.43 9.935 24.14 15.49	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	78.89 75.89 53.66 71.18
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean	0.927 /el 46.85 46.21 40.52 45.16 53.87 2.43 9.935 24.14 15.49	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	78.89 75.89 53.66 71.18
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star	0.927 /el 46.85 46.21 40.52 45.16 53.87 2.43 9.935 24.14 15.49 145.8	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Normal at 5% Significance Lev	78.89 75.89 53.66 71.18
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic	0.927 /el  46.85 46.21 40.52 45.16 53.87  2.43 9.935 24.14 15.49 145.8	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test Data appear Normal at 5% Significance Lev  Nonparametric Statistics	78.89 75.89 53.66 71.18
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value	0.927 /el  46.85 46.21 40.52 45.16 53.87  2.43 9.935 24.14 15.49 145.8  0.422 0.754	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Normal at 5% Significance Lev  Nonparametric Statistics 90% Percentile	78.89 75.89 53.66 71.18 121
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	0.927 /el  46.85 46.21 40.52 45.16 53.87  2.43 9.935 24.14 15.49 145.8  0.422 0.754 0.113	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test Data appear Normal at 5% Significance Lev  Nonparametric Statistics 90% Percentile 95% Percentile	78.89 75.89 53.66 71.18 121 rel
	Normal Distribution Test Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution 95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value	0.927 /el  46.85 46.21 40.52 45.16 53.87  2.43 9.935 24.14 15.49 145.8  0.422 0.754 0.113 0.161	Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Normal at 5% Significance Lev  Nonparametric Statistics 90% Percentile	78.89 75.89 53.66 71.18 121 rel

_ 1	Y E C D I			r
	Accuming Commo Dictribution		95% UTL with 90% Coverage	47.2
	Assuming Gamma Distribution 90% Percentile	11 00	95% Percentile Bootstrap UTL with 90% Coverage	
1	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
	99% Percentile	/3./1	95% UPL	
	050/14/14		95% Chebyshev UPL	
4	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	62.64
Ц	95% HW Approx. Gamma UPL			
	95% WH Approx. Gamma UTL with 90% Coverage			
1	95% HW Approx. Gamma UTL with 90% Coverage	59.09		
'				
•				
,	M MG/KG NICKEL  (so_sb)			
4				
4			Statistics	
╝	Total Number of Observations		Number of Distinct Observations	78
•	Tolerance Factor	1.524		
3				
1	Raw Statistics		Log-Transformed Statistics	
	Minimum	-	Minimum	2.028
1	Maximum	37.1	Maximum	3.614
1	Second Largest	31	Second Largest	3.434
1	First Quartile		First Quartile	
*	Median		Median	
	Third Quartile		Third Quartile	
	Mean		Mean	
,		5.815		0.331
1	Coefficient of Variation		30	0.331
7				
,	Skewness	0.701		
,		D I	d Otatical co	
		Backgroun	d Statistics	
3	Normal Distribution Test	0.0007	Lognormal Distribution Test	0.070
	Lilliefors Test Statistic		Lilliefors Test Statistic	
	Lilliefors Critical Value		Lilliefors Critical Value	
٠	Data not Normal at 5% Significance Leve	l	Data appear Lognormal at 5% Significance Lognormal	evei
,	Accuming Normal Distribution		Assuming Lognormal Distribution	
_	Assuming Normal Distribution			
3	0E9/ LITE with 009/ Coverage	26 20		27 22
1	95% UTL with 90% Coverage	26.28	95% UTL with 90% Coverage	
1	95% UPL (t)	27.12	95% UTL with 90% Coverage 95% UPL (t)	28.68
,	95% UPL (t) 90% Percentile (z)	27.12 24.87	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	28.68 25.22
7	95% UPL (t) 90% Percentile (z) 95% Percentile (z)	27.12 24.87 26.98	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	28.68 25.22 28.45
1 1	95% UPL (t) 90% Percentile (z)	27.12 24.87 26.98	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	28.68 25.22 28.45
2 7 7	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	27.12 24.87 26.98	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	28.68 25.22 28.45
2 T	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Gamma Distribution Test	27.12 24.87 26.98 30.94	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	28.68 25.22 28.45 35.66
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star	27.12 24.87 26.98 30.94	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	28.68 25.22 28.45 35.66
3 T	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star	27.12 24.87 26.98 30.94 9.13 1.907	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	28.68 25.22 28.45 35.66
3 Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean	27.12 24.87 26.98 30.94 9.13 1.907 17.41	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	28.68 25.22 28.45 35.66
2 2 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	28.68 25.22 28.45 35.66
* * * * * * * * * * * * * * * * * * *	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test	28.68 25.22 28.45 35.66
* * * * * * * * * * * * * * * * * * *	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star  Theta Star  MLE of Mean  MLE of Standard Deviation nu star	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance	28.68 25.22 28.45 35.66
2	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test k star Theta Star MLE of Mean MLE of Standard Deviation	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant	28.68 25.22 28.45 35.66
* * * * * * * * * * * * * * * * * * * *	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance	28.68 25.22 28.45 35.66
, , , , , , , , , , , , , , , , , , ,	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star  Theta Star  MLE of Mean  MLE of Standard Deviation nu star  A-D Test Statistic	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant	28.68 25.22 28.45 35.66 <b>ce Lev</b>
	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752 0.075	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile	28.68 25.22 28.45 35.66 <b>ce Lev</b> 25.4 27.11
-	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752 0.075 0.0894	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile	28.68 25.22 28.45 35.66 <b>ce Lev</b> 25.4 27.11
	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752 0.075 0.0894	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile	28.68 25.22 28.45 35.66 <b>ce Lev</b> 25.4 27.11
	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752 0.075 0.0894	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile	28.68 25.22 28.45 35.66 <b>ce Lev</b> 25.4 27.11 31.06
	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752 0.075 0.0894 <b>ce Level</b>	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile	28.68 25.22 28.45 35.66 <b>ce Lev</b> 25.4 27.11 31.06
	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752 0.075 0.0894 <b>ce Level</b>	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile	28.68 25.22 28.45 35.66 <b>ce Lev</b> 25.4 27.11 31.06 26.8 26.83
	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile 95% Percentile	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752 0.075 0.0894 <b>ce Level</b>	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage	28.68 25.22 28.45 35.66 <b>ce Lev</b> 25.4 27.11 31.06 26.8 26.83 26.8
	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752 0.075 0.0894 <b>ce Level</b>	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage	28.68 25.22 28.45 35.66 <b>ce Lev</b> 25.4 27.11 31.06 26.8 26.8 26.8 27.2
	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile 95% Percentile	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752 0.075 0.0894 ce Level 25.09 27.85 33.54	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	25.4 27.11 31.06 26.8 26.8 27.2 42.89
	95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Gamma Distribution Test  k star Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution 90% Percentile 95% Percentile	27.12 24.87 26.98 30.94 9.13 1.907 17.41 5.763 1826 0.537 0.752 0.075 0.0894 ce Level 25.09 27.85 33.54	95% UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test  Data appear Gamma Distributed at 5% Significant  Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage	25.4 27.11 31.06 26.8 26.8 27.2 42.89

	y		· · · · · · · · · · · · · · · · · · ·	r
	95% HW Approx. Gamma UTL with 90% Coverage	26 92		
	3370 TW Approx. damina 612 with 3070 coverage	20.32		
* 1				
* 1	M MG/KG NICKEL  (so_ss)			
	IMPROPREDICTE (SO_SS)			
		General	Statistics	
	Total Number of Observations		Number of Distinct Observations	74
* 1	Tolerance Factor		Trainber of Biotinet Observations	7-7
	Tolorance Factor	1.000		
	Raw Statistics		Log-Transformed Statistics	
	Minimum	2.8	Minimum	1.03
	Maximum		Maximum	
* 1	Second Largest		Second Largest	
* 1	First Quartile		First Quartile	
	Median		Median	
	Third Quartile		Third Quartile	
		9.252	Mean	
8 1		3.163		0.36
	Coefficient of Variation			0.00
	Skewness			
		Backgroun	nd Statistics	
1 1	Normal Distribution Test		Lognormal Distribution Test	
1 1	Lilliefors Test Statistic	0.0693	Lilliefors Test Statistic	0.0803
	Lilliefors Critical Value	0.0826	Lilliefors Critical Value	0.0826
	Data appear Normal at 5% Significance Lev	/el	Data appear Lognormal at 5% Significance Lognormal	evel
			0	
1 1	Assuming Normal Distribution		Assuming Lognormal Distribution	
	95% UTL with 90% Coverage	14.02	95% UTL with 90% Coverage	14.96
	95% UPL (t)	14.52	95% UPL (t)	15.84
1 0	90% Percentile (z)		90% Percentile (z)	
1 1	95% Percentile (z)	14.45	95% Percentile (z)	15.73
1 1	99% Percentile (z)	16.61	99% Percentile (z)	20.1
1 1				
, ,	Gamma Distribution Test		Data Distribution Test	
2 1	k star	8.125	Data appear Normal at 5% Significance Lev	el
, ,	Theta Star	1.139		
9 3	MLE of Mean	9.252		
3 8	MLE of Standard Deviation			
3 0	nu star	1869		
	A-D Test Statistic		Nonparametric Statistics	
1 1	5% A-D Critical Value		90% Percentile	
1 7	K-S Test Statistic		95% Percentile	
	5% K-S Critical Value		99% Percentile	16.29
	Data appear Gamma Distributed at 5% Significan	ce Level		
1 4				
1 1	Assuming Gamma Distribution	L	95% UTL with 90% Coverage	
	90% Percentile		95% Percentile Bootstrap UTL with 90% Coverage	
	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
	99% Percentile	18.42	95% UPL	
	050/14814	45.0	95% Chebyshev UPL	
	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	18.4
	95% HW Approx. Gamma UPL			
	95% WH Approx. Gamma UTL with 90% Coverage			
, ,	95% HW Approx. Gamma UTL with 90% Coverage	14.59		
7 1				
, ,				
	MIMG/KGIDOTASSILIMI /br. no\			
	M MG/KG POTASSIUM  (br_na)			
		General	Statistics	
( )	Number of Valid Data		Number of Detected Data	28
	I raumper of valid Data	50	Number of Detected Data	

	y y c b 1		o 8 1 1 2		
				_	
	Number of Distinct Detected Data		Number of Non-Detect Data		
	Tolerance Factor	1.777	Percent Non-Detects	6.67%	
2 3 4 4	Raw Statistics		Log-transformed Statistics		
	Minimum Detected	E3 0	Minimum Detected	2 097	
	Maximum Detected		Maximum Detected		
	Mean of Detected		Mean of Detected		
	SD of Detected	119.1	SD of Detected	0.63	
2 3 4 1	Minimum Non-Detect	48.8	Minimum Non-Detect	3.888	
1 1 4 1	Maximum Non-Detect	50.5	Maximum Non-Detect	3 922	
	Maximum Non Botoot	00.0	Maximum Non Botost	O.OLL	
2 2 4 4	Data salah Madalah Data dian Himita		Olerata Data stian Limit Occurati		
	Data with Multiple Detection Limits		Single Detection Limit Scenario	T -	
, , , ,	Note: Data have multiple DLs - Use of KM Method is				
	For all methods (except KM, DL/2, and ROS Methods	s),	Number treated as Detected with Single DL	28	
	Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	6.67%	
	, and the second				
1 1 4 4		Daakara	d Statistics		
	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value		
1 1 1 1	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic		
1 1 1 1	5% Shapiro Wilk Critical Value	0.924	5% Shapiro Wilk Critical Value	0.924	
1 1 1 1	Data not Normal at 5% Significance Leve		Data appear Lognormal at 5% Significance Lo		
1 1 1 1	Data not resimal at 070 digitilibation 2010	•	_ atta appear _ag.torniar at 0 /0 orginiloanoo Et	• .	
	A a complete Marrian Distribution		A a complete La grant and Distribution		
	Assuming Normal Distribution		Assuming Lognormal Distribution	ı	
	DL/2 Substitution Method	<u> </u>	DL/2 Substitution Method		
	Mean	166.1	Mean (Log Scale)	4.858	
9 3 3 W	SD	121.1	SD (Log Scale)	0.755	
9 3 3 0	95% UTL 90% Coverage		95% UTL 90% Coverage		
1 1 1 0	95% UPL (t)		95% UPL (t)		
	90% Percentile (z)		90% Percentile (z)		
	95% Percentile (z)		95% Percentile (z)	445.3	
1 1 1 1	99% Percentile (z)	447.9	99% Percentile (z)	744.8	
	Maximum Likelihood Estimate(MLE) Method		Log ROS Method		
			· ·	100.0	
		163.3	Mean in Original Scale		
, , , ,	SD	123.6	SD in Original Scale		
	95% UTL with 90% Coverage	383	95% UTL with 90% Coverage	467.9	
			95% BCA UTL with 90% Coverage	403 8	
2 3 # 0					
			<u> </u>	403 B	
1 1 1 1	050/ 1101 (1)	070.0	95% Bootstrap (%) UTL with 90% Coverage		
1 1 1 1	95% UPL (t)		95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t)	451.5	
3 3 4 1	90% Percentile (z)	321.8	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	451.5 328.1	
2 1 4 2	90% Percentile (z) 95% Percentile (z)	321.8 366.7	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	451.5 328.1 425.7	
2 1 4 2	90% Percentile (z) 95% Percentile (z)	321.8 366.7	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	451.5 328.1 425.7	
2 2 4 2 2 2 2 2 4 3 2 2 2 4 3 2 2 2 4 3 2 2 2 4 3 2 2 2 2	90% Percentile (z)	321.8 366.7	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z)	451.5 328.1 425.7	
2 2 4 1 2 2 4 2 2 2 4 1 2 2 4 1	90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	321.8 366.7 451	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	451.5 328.1 425.7 693.5	
2 1 + 1 2 1 + 2 2 1 + 3 2 1 + 4 2 1 + 4	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values	321.8 366.7 451	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test with Detected Values (	451.5 328.1 425.7 693.5	
2 1 * 1 2 1 * 2 2 1 * 3 2 1 * 4 2 1 * 4 2 1 * 4 3 1 * 4	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected)	321.8 366.7 451 <b>Only</b> 2.436	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	451.5 328.1 425.7 693.5	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star	321.8 366.7 451 <b>Only</b> 2.436 72.32	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Data Distribution Test with Detected Values (	451.5 328.1 425.7 693.5	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected)	321.8 366.7 451 <b>Only</b> 2.436 72.32	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) Data Distribution Test with Detected Values (c)	451.5 328.1 425.7 693.5	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star	321.8 366.7 451 <b>Only</b> 2.436 72.32	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) Data Distribution Test with Detected Values (c)	451.5 328.1 425.7 693.5	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star	321.8 366.7 451 <b>S Only</b> 2.436 72.32 136.4	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C  Data appear Gamma Distributed at 5% Significance	451.5 328.1 425.7 693.5	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic	321.8 366.7 451 <b>S Only</b> 2.436 72.32 136.4	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics	451.5 328.1 425.7 693.5 Only	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value	321.8 366.7 451 <b>S Only</b> 2.436 72.32 136.4 0.561 0.755	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values Of Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method	451.5 328.1 425.7 693.5 Only	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	321.8 366.7 451 <b>S Only</b> 2.436 72.32 136.4 0.561 0.755 0.136	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics  Kaplan-Meier (KM) Method Mean	451.5 328.1 425.7 693.5 <b>Only</b> the Level	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics  Kaplan-Meier (KM) Method Mean	451.5 328.1 425.7 693.5 Only	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics  Kaplan-Meier (KM) Method Mean	451.5 328.1 425.7 693.5 Only the Level	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values Of Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean	451.5 328.1 425.7 693.5 Only the Level 168 117 21.76	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values O Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage	451.5 328.1 425.7 693.5 Only te Level 168 117 21.76 376	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167 ce Level	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (C) Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL	451.5 328.1 425.7 693.5 <b>Only</b> the Level 168 117 21.76 376 686.5	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167 ce Level	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values C Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics  Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t)	451.5 328.1 425.7 693.5 Only the Level 168 117 21.76 376 686.5 370.1	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167 ce Level	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (c) Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z)	451.5 328.1 425.7 693.5 <b>Dnly</b> the Level 168 117 21.76 376 686.5 370.1 318	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167 ce Level	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (c) Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z)	451.5 328.1 425.7 693.5 <b>Dnly</b> the Level 168 117 21.76 376 686.5 370.1 318	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167 ce Level	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (c) Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z)	451.5 328.1 425.7 693.5 <b>Dnly</b> be Level 168 117 21.76 376 686.5 370.1 318 360.5	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167 ce Level	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (c) Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z)	451.5 328.1 425.7 693.5 <b>Dnly</b> be Level 168 117 21.76 376 686.5 370.1 318 360.5	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star	321.8 366.7 451 3 Only 2.436 72.32 136.4 0.561 0.755 0.136 0.167 ce Level 164.4 125 123.3 0.441	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values (c)  Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z)	168 117 21.76 376 686.5 370.1 318 360.5 440.2	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167 <b>ce Level</b> 164.4 125 123.3 0.441 372.8	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values Of Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	168 117 21.76 376 686.5 370.1 318 360.5 440.2	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167 <b>ce Level</b> 164.4 125 123.3 0.441 372.8 26.47	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values Of Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)	451.5 328.1 425.7 693.5 Only the Level 168 117 21.76 376 686.5 370.1 318 360.5 440.2	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167 <b>ce Level</b> 164.4 125 123.3 0.441 372.8 26.47	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values Of Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	451.5 328.1 425.7 693.5 Only the Level 168 117 21.76 376 686.5 370.1 318 360.5 440.2	
	90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star	321.8 366.7 451 2.436 72.32 136.4 0.561 0.755 0.136 0.167 <b>ce Level</b> 164.4 125 123.3 0.441 372.8 26.47 3.543	95% Bootstrap (%) UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Data Distribution Test with Detected Values Of Data appear Gamma Distributed at 5% Significance  Nonparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean 95% KM UTL with 90% Coverage 95% KM Chebyshev UPL 95% KM UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)	168 117 21.76 376 686.5 370.1 318 360.5 440.2	

	Y E C D E	h.	0 8 1 1 E	r
1 2	90% Percentile	4EG 2	95% HW Approx. Gamma UTL with 90% Coverage	600 E
	95% Percentile		95% HW Approx. Gamma OTL with 90% Coverage	0.00.5
2 0	99% Percentile	1169		
, ,	N . B. /2' ·			
, ,	Note: DL/2 is not a recommended method.			
, ,	M MG/KG POTASSIUM  (so_sb)			
			Statistics	
	Total Number of Observations		Number of Distinct Observations	86
	Tolerance Factor	1.524		
*				
٠	Raw Statistics		Log-Transformed Statistics	
'	Minimum	288	Minimum	5.663
	Maximum	2440	Maximum	7.8
7	Second Largest	2040	Second Largest	7.621
,	First Quartile		First Quartile	
,	Median		Median	
,	Third Quartile		Third Quartile	
1		766.4	Mean	
		462.6		0.51
-	Coefficient of Variation			
	Skewness			
	CKCWIICSS	1.720		
		Rackgrour	nd Statistics	
	Normal Distribution Test	Daongroui	Lognormal Distribution Test	
,	Lilliefors Test Statistic	0 254	Lilliefors Test Statistic	ი 199
	Lilliefors Critical Value		Lilliefors Critical Value	
	Data not Normal at 5% Significance Leve		Data not Lognormal at 5% Significance Lev	
1 1	Data not Normal at 5% digililicance Leve	•	Data not Edgnormal at 0 % dignificance Lev	OI .
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	95% UTL with 90% Coverage	1471	95% UTL with 90% Coverage	1444
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)		99% Percentile (z)	
. ,	33 % T Greentile (2)	1042	33 % 1 Greenule (2)	21/7
	Gamma Distribution Test		Data Distribution Test	
_	k star	3 538		
			I ) ata do not tollow a I ) iscernable I ) istribilition ((	n 051
			Data do not follow a Discernable Distribution (	0.05)
1 1	Theta Star	216.6	Data do not follow a Discernable Distribution (	0.05)
	Theta Star MLE of Mean	216.6 766.4	Data do not follow a Discernable Distribution (	0.05)
	Theta Star MLE of Mean MLE of Standard Deviation	216.6 766.4 407.4	Data do not follow a Discernable Distribution (	0.05)
	Theta Star MLE of Mean	216.6 766.4 407.4	Data do not follow a Discernable Distribution (	0.05)
	Theta Star MLE of Mean MLE of Standard Deviation nu star	216.6 766.4 407.4 707.6		0.05)
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic	216.6 766.4 407.4 707.6 7.05	Nonparametric Statistics	
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value	216.6 766.4 407.4 707.6 7.05 0.757	Nonparametric Statistics 90% Percentile	1513
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	216.6 766.4 407.4 707.6 7.05 0.757 0.218	Nonparametric Statistics 90% Percentile 95% Percentile	1513 1681
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899	Nonparametric Statistics 90% Percentile	1513 1681
* * * * * * * * * * * * * * * * * * *	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899	Nonparametric Statistics 90% Percentile 95% Percentile	1513 1681
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899	Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile	1513 1681 2044
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899 b. Level	Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile	1513 1681 2044
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899 <b>Elevel</b>	Nonparametric Statistics  90% Percentile 95% Percentile 99% Percentile 99% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage	1513 1681 2044 1670 1671
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899 Elevel	Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage	1513 1681 2044 1670 1671 1671
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899 Elevel	Nonparametric Statistics 90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL	1513 1681 2044 1670 1671 1671 1699
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899 <b>Level</b> 1313 1536 2014	Nonparametric Statistics  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	1513 1681 2044 1670 1671 1671 1699 2793
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899 2 Level 1313 1536 2014	Nonparametric Statistics  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	1513 1681 2044 1670 1671 1671 1699
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899 2 Level 1313 1536 2014	Nonparametric Statistics  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	1513 1681 2044 1670 1671 1671 1699 2793
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899 2 Level 1313 1536 2014 1536 1539 1445	Nonparametric Statistics  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	1513 1681 2044 1670 1671 1671 1699 2793
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899 2 Level 1313 1536 2014 1536 1539 1445	Nonparametric Statistics  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	1513 1681 2044 1670 1671 1671 1699 2793
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899 2 Level 1313 1536 2014 1536 1539 1445	Nonparametric Statistics  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	1513 1681 2044 1670 1671 1671 1699 2793
	Theta Star MLE of Mean MLE of Standard Deviation nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution 90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL	216.6 766.4 407.4 707.6 7.05 0.757 0.218 0.0899 2 Level 1313 1536 2014 1536 1539 1445	Nonparametric Statistics  90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% UTL with 90% Coverage 95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	1513 1681 2044 1670 1671 1671 1699 2793

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, , , ,		00====1	Canalinalir -				
	N 1 (V/115)	General	Statistics				
	Number of Valid Data	-			Number of Detected		
	Number of Distinct Detected Data			N	umber of Non-Detect I		
	Tolerance Factor	1.506			Percent Non-Det	ects 34.	78%
	Raw Statistics			Log-trai	nsformed Statistics		
	Minimum Detected	-			Minimum Dete		
	Maximum Detected				Maximum Dete		
	Mean of Detected				Mean of Dete		
	SD of Detected				SD of Dete		
	Minimum Non-Detect	_			Minimum Non-De		
	Maximum Non-Detect	615			Maximum Non-De	etect 6.42	22
	Data with Multiple Detection Limits				tection Limit Scenario	- I I I I I I	
	Note: Data have multiple DLs - Use of KM Method is				Non-Detect with Single		3
	For all methods (except KM, DL/2, and ROS Methods	s),	Nu		as Detected with Single		
	Observations < Largest ND are treated as NDs			Single [	DL Non-Detect Percen	tage 93.9	91%
			d Statistics				
	Normal Distribution Test with Detected Values		Lognorn	nal Distribution	n Test with Detected \		
	Lilliefors Test Statistic				Lilliefors Test Sta		
	5% Lilliefors Critical Value				5% Lilliefors Critical V		
	Data appear Normal at 5% Significance Lev	/el	Data	appear Logno	ormal at 5% Significan	ce Level	!
	Assuming Normal Distribution			Assuming I	Lognormal Distribution		
	DL/2 Substitution Method				DL/2 Substitution Me		
		335.2			Mean (Log So		
		180.6			SD (Log So		
	95% UTL 90% Coverage				95% UTL 90% Cove		
	95% UPL (t)					L (t) 785	
	90% Percentile (z)				90% Percentil		
, . , ,	95% Percentile (z)				95% Percentil	• •	
	99% Percentile (z)	755.3			99% Percentil	e (z) 117	76
	Maximum Likelihood Estimate(MLE) Method				Log ROS Me		
	Mean				Mean in Original S		
		292.4			SD in Original S		
	95% UTL with 90% Coverage	604.5			UTL with 90% Cove		
					UTL with 90% Cove		
1 + 1 1		054.1	95%	Bootstrap (%)	UTL with 90% Cove		
1 + 1 1	95% UPL (t)					L (t) 633	
	90% Percentile (z)				90% Percentil	• •	
	95% Percentile (z)				95% Percentil	. ,	
	99% Percentile (z)	844.3			99% Percentil	e (z)  808	3.2
	Ones District the Table 19 5 5 5 12 12	0-1		B:	and the state of t		
	Gamma Distribution Test with Detected Values				est with Detected Values		
	k star (bias corrected)		Da	ıa appear Nori	mal at 5% Significance	Level	
	Theta Star					1	
	nu star	1/01					
1 + 1 1	A D T LOUR OF	0.500		NI	nometrie Otetietie		
1 + 1 1	A-D Test Statistic				rametric Statistics	u 1	
1 + 1 1	5% A-D Critical Value K-S Test Statistic			ŀ	Kaplan-Meier (KM) Me		7
1 + 1 +					IV.	lean 367	
1 + 1 +	5% K-S Critical Value				OF (1	SD 147	
	Data appear Gamma Distributed at 5% Significan	ce revei		000/1/14		lean 14.0	
1 + 1 1				95% KM	UTL with 90% Cove		
1 + 1 1					95% KM Chebyshev 95% KM UP		
1 + 1 +	Assuming Gamma Distribution						ა.4
2 + 1 +	Gamma ROS Statistics with Extrapolated Data						2.6
2 + 1 + 2	Gamma ROS Statistics with Extrapolated Data Mean	306			90% Percentil	e (z) 556	
2 * 1 T	Gamma ROS Statistics with Extrapolated Data Mean Median	306 335			90% Percentil 95% Percentil	e (z) 556 e (z) 610	0.4
3 4 3 4	Gamma ROS Statistics with Extrapolated Data Mean Median SD	306 335 218.3			90% Percentil	e (z) 556 e (z) 610	0.4
2 * 1 * 1 * 2 * 4 * 1 * 2 * 4 * 1 * 2 * 4 * 1 * 2 * 4 * 1 * 2 * 4 * 2 * 4 * 2 * 4 * 4 * 2 * 4 * 4	Gamma ROS Statistics with Extrapolated Data Mean Median SD	306 335 218.3 0.193			90% Percentil 95% Percentil	e (z) 556 e (z) 610 e (z) 711	0.4

	А В С						1		r
		Nu star	11 28	95% W	lilson Hilfort	tv (\\/H\ \	nnroy G	amma UPL	1227
	95% Percentile of C							amma UPL	
* * 1	95 % Fercentile of C	Jilisquale (ZK)							
		00/ D	1	95% WH App	•				
		0% Percentile		95% HW Ap	pprox. Gam	mauil	with 90%	。Coverage	1453
		5% Percentile							
	9	9% Percentile	3441						
	Note: DL/2 is not a recommended me	thod.							
* 1 1									
	M MG/KG SELENIUM  (br_na)								
* 1 1			General	Statistics					
	Number	r of Valid Data	30			Numl	ber of Det	tected Data	1
	Number of Distinct [	Detected Data	1			Number	r of Non-[	Detect Data	29
	Warning: Only one distinct data value	was detected	! ProUCL	(or any other	r software)	should n	ot be use	d on such	a data se
	ested to use alternative site specific v								
	•			<u> </u>					
	The data set t	for veriable M	IMC/KCISI	ELENILIMI /h	or no) woo	not proo	oooodl		
	i ile uata set i	ioi variabie ivi	ING/KGJSI	EFEIAIOMI (D	JI_IIa) was	not proc	esseu:		
* * 1									
	M MG/KG SELENIUM  (so_sb)								
				Statistics					_
		r of Valid Data						tected Data	
* 1 1	Number of Distinct I	Detected Data	5			Number	r of Non-[	Detect Data	95
* 1 1	Tol	erance Factor	1.524			F	Percent N	Ion-Detects	95.00%
* 3 *									
* 1 *	Raw Statistics			Log-transformed Statistics					
	Minir	num Detected	0.222				Minimu	m Detected	-1.505
+ 1 1	Maxir	num Detected	0.71				Maximu	m Detected	-0.342
* 1 *		an of Detected						of Detected	
* 1 *		D of Detected						of Detected	
		m Non-Detect				N		Non-Detect	
		m Non-Detect						Non-Detect	
	Waxiiiiu	III IVOII-Detect	0.505			10	iaximum	NOII-Detect	-0.550
	Data with Multiple Detec	tion Limito			Single I	Detection	Limit Co	onorio	
	Note: Data have multiple DLs - Use of			Niconolo					00
_	•							h Single DL	
	For all methods (except KM, DL/2, and		S),	Nui				h Single DL	
	Observations < Largest ND are treated	l as NDs			Sing	le DL Noi	n-Detect	Percentage	99.00%
		rning: There							
	Note: It should be							set	
	the resulting	calculations	may not be	e reliable eno	ough to draw	w conclu	sions		
1									
	It is recommended to hav	e 10-15 or mo	ore distinct	observations	s for accura	ate and n	neaningf	ul results.	
			Backgroun	nd Statistics					
	Normal Distribution Test with De				nal Distribu	tion Test	with Det	ected Value	s Only
* * 1		Test Statistic		<u></u>				est Statistic	
	5% Shapiro Wilk				.5			ritical Value	
	Data appear Normal at 5% Si			Data :				nificance L	
	Data appear Hormar at 5 % Of	gcarice Le	· • ·	Data	appear LU	g. ioi illai c	a. 0 /0 Olg	ourice Li	.,01
	Assuming Normal Dia	tribution			Accum!-	ng Logno	rmal Dict	ribution	
	Assuming Normal Dis				Assumin				
	DL/2 Substi	itution Method				DL/2		tion Method	0.000
			0.138					(Log Scale)	
			0.0889					(Log Scale)	
	95% UTL 9	0% Coverage				95% l		6 Coverage	
		95% UPL (t)						95% UPL (t)	
* * 1	90%	Percentile (z)	0.251				90% Pe	ercentile (z)	0.211
	95%	Percentile (z)	0.284				95% Pe	ercentile (z)	0.246
	0070	(=)		1				- (-)	

	Y Y 1	١.	0 II I I K	r
	99% Percentile (z)	0.344	99% Percentile (z)	0.327
	33 70 1 Greentile (2)	0.044	33701 Creentile (2)	0.027
	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
	Maximum Elicolinood Estimato(MEE) Motifica	1071	Mean in Original Scale	0.0619
			SD in Original Scale	
			Mean in Log Scale	
			SD in Log Scale	
			95% UTL 90% Coverage	0.152
1 0 1 1			95% UPL (t)	
			90% Percentile (z)	
			95% Percentile (z)	
1 0 1 0			99% Percentile (z)	
1 0 1 1	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values (	
1 + 1 1	k star (bias corrected)		Data appear Normal at 5% Significance Lev	el
	Theta Star			
	nu star	26.36		
0 9 1	A-D Test Statistic		Nonparametric Statistics	
	5% A-D Critical Value		Kaplan-Meier (KM) Method	
	K-S Test Statistic		Mean	
	5% K-S Critical Value			0.0613
	Data appear Gamma Distributed at 5% Significan	ce Level	SE of Mean	
			95% KM UTL with 90% Coverage	
	Assuming Gamma Distribution	T	95% KM Chebyshev UPL	
	Gamma ROS Statistics with Extrapolated Data	0.0010	95% KM UPL (t)	
		0.0218	90% Percentile (z)	
	Median		95% Percentile (z)	
		0.103	99% Percentile (z)	0.376
		0.0923	0 50011 11 11 5 1 1 1 1 5	
	Theta star		Gamma ROS Limits with Extrapolated Dat	
	Nu star	-	95% Wilson Hilferty (WH) Approx. Gamma UPL	0.0322
	95% Percentile of Chisquare (2k)	1.075	95% Hawkins Wixley (HW) Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	
	90% Percentile	0.0561	95% HW Approx. Gamma UTL with 90% Coverage	
	95% Percentile		95% HW Approx. Gamina OTL with 90% Coverage	0.0110
	99% Percentile	-		
	3370 T Creentile	0.001	<u> </u>	
1 + + 1	Note: DL/2 is not a recommended method.			
	M MG/KG SELENIUM  (so_ss)			
			Statistics	•
	Number of Valid Data		Number of Detected Data	
	Number of Distinct Detected Data		Number of Non-Detect Data	-
	Tolerance Factor	1.506	Percent Non-Detects	60.87%
	Raw Statistics	0.40	Log-transformed Statistics	
	Minimum Detected		Log Statistics Not Avaliable	
	Maximum Detected			
	Mean of Detected			
0 4 3	Mean of Detected			
0 4 3	Mean of Detected			
	Maximum Non-Detect	J./		
	Data with Multiple Detection Limits		Single Detection Limit Cooperie	
	Data with Multiple Detection Limits  Note: Data have multiple DLs - Use of KM Method is	recommon	Single Detection Limit Scenario  Number treated as Non-Detect with Single DL	115
0 4 3	For all methods (except KM, DL/2, and ROS Methods		Number treated as Non-Detect with Single DL  Number treated as Detected with Single DL	
	Observations < Largest ND are treated as NDs	>),	Single DL Non-Detect Percentage	
	Observations - Largest ND are treated as NDS		Single DE Noil-Detect Fercellage	100.00%
		Backgrour	nd Statistics	
	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	s Only
0 1 1	Shapiro Wilk Test Statistic		Not Available	Johny
	Chapito Wilk Test Otatistic	3.000	140t Available	1

	0.045				
5% Shapiro Wilk Critical Value					
Data not Normal at 5% Significance Leve					
Assuming Normal Distribution		Assuming Lognormal Distribution			
DL/2 Substitution Method		DL/2 Substitution Method	N/A		
Mean	-85.99				
SD	656 5				
99% Percentile (z)	1441				
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	N/A		
Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values C	nlv		
Camma Claudico Not / Wallabio		Data appear damina Dietribated at 0 % eignmearte	0 2010		
		Managaran Ade Octobrit			
			0.162		
		SE of Mean			
		95% KM UTL with 90% Coverage	0.545		
		. ,			
		99% Percentile (z)	0.678		
M MG/KG SILVER  (br_na)					
	General	Statistics			
Number of Valid Data		Statistics  Number of Detected Data	3		
Number of Valid Data Number of Distinct Detected Data	30				
Number of Distinct Detected Data	30	Number of Detected Data Number of Non-Detect Data			
Number of Distinct Detected Data Warning: Da	30 3 ta set has o	Number of Detected Data  Number of Non-Detect Data  only 3 Detected Values.			
Number of Distinct Detected Data Warning: Da This is not enough to compute	30 3 ta set has o meaningful	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates.			
Number of Distinct Detected Data Warning: Da This is not enough to compute	30 3 ta set has o meaningful	Number of Detected Data  Number of Non-Detect Data  only 3 Detected Values.			
Number of Distinct Detected Data Warning: Da This is not enough to compute No s	30 3 ta set has o meaningful statistics wi	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates.  Il be produced!	27		
Number of Distinct Detected Data Warning: Da This is not enough to compute	30 3 ta set has o meaningful statistics wi	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates.	27		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor	30 3 ta set has o meaningful statistics wi	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates.  Il be produced!  Percent Non-Detects	27		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics	30 3 ta set has omeaningful statistics wi	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates. Il be produced!  Percent Non-Detects  Log-transformed Statistics	90.00		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected	30 3 ta set has comeaningful statistics wi 1.777	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates. Il be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected	90.00		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected	30 3 ta set has of meaningful statistics wi 1.777 0.0805 0.095	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates. II be produced!  Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected	90.00° -2.519 -2.354		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected	30 3 ta set has of meaningful statistics wi 1.777 0.0805 0.095 0.0868	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data only 3 Detected Values.  and reliable test statistics and estimates.  Il be produced!  Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected	90.00 -2.519 -2.354 -2.446		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected	30 3 ta set has comeaningful statistics with 1.777 0.0805 0.095 0.0868 0.00742	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates. II be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected	90.00° -2.519 -2.354 -2.446 0.084		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected	30 3 ta set has comeaningful statistics with 1.777 0.0805 0.095 0.0868 0.00742	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data only 3 Detected Values.  and reliable test statistics and estimates.  Il be produced!  Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected	90.00° -2.519 -2.354 -2.446 0.084		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected	30 3 ta set has comeaningful statistics with 1.777 0.0805 0.095 0.0868 0.00742 0.048	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates. II be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected	90.00° -2.519 -2.354 -2.446 0.084 -3.037		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	30 3 ta set has comeaningful statistics with 1.777 0.0805 0.095 0.0868 0.00742 0.048	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates. II be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	90.00° -2.519 -2.354 -2.446 0.084 -3.037		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect	30 3 ta set has comeaningful statistics with 1.777 0.0805 0.095 0.0868 0.00742 0.048	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates. II be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	90.00° -2.519 -2.354 -2.446 0.084 -3.037		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect	30 3 ta set has comeaningful statistics with the statistics with	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates.  Il be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario	90.00° -2.519 -2.354 -2.446 0.084 -3.037 -0.734		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is	30 3 ta set has comeaningful statistics with the statistics with	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates. II be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL	90.00° -2.519 -2.354 -2.446 0.084 -3.037 -0.734		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods)	30 3 ta set has comeaningful statistics with the statistics with	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates.  Il be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL	90.00° -2.519-2.352-2.446 0.084-3.037-0.734 30 0		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is	30 3 ta set has comeaningful statistics with the statistics with	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates. II be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL	90.00° -2.519-2.352-2.446 0.084-3.037-0.734 30 0		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods)	30 3 ta set has comeaningful statistics with the statistics with	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates.  Il be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL	90.00° -2.519-2.352-2.446 0.084-3.037-0.734 30 0		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs	30 3 ta set has comeaningful statistics with 1.777 0.0805 0.095 0.0868 0.00742 0.048 0.48 0.48	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates.  Il be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage	90.00° -2.519-2.352-2.446 0.084-3.037-0.734 30 0		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Under Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: There are on	30 3 ta set has comeaningful statistics with the statistics with	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates.  Il be produced!  Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage	90.00° -2.519 -2.352 -2.44€ 0.084 -3.037 -0.734 30 0 100.00		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: There are on	30 3 ta set has comeaningful statistics wi 1.777  0.0805 0.095 0.0868 0.00742 0.048 0.48  recommens),	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates.  Il be produced!  Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  et Detected Values in this data set gh to perform GOF tests, bootstrap, and ROS methe	90.00° -2.519 -2.352 -2.44€ 0.084 -3.037 -0.734 30 0 100.00		
Number of Distinct Detected Data Warning: Da This is not enough to compute No s  Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: There are on	30 3 ta set has comeaningful statistics wi 1.777  0.0805 0.095 0.0868 0.00742 0.048 0.48  recommens),	Number of Detected Data Number of Non-Detect Data only 3 Detected Values. and reliable test statistics and estimates.  Il be produced!  Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage	90.00° -2.519 -2.352 -2.44€ 0.084 -3.037 -0.734 30 0 100.00		
	Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method Gamma Distribution Test with Detected Values Gamma Statistics Not Available	DL/2 Substitution Method  Mean -85.99 SD 656.5 95% UTL 90% Coverage 902.9 95% UPL (t) 1007 90% Percentile (z) 755.4 95% Percentile (z) 993.9 99% Percentile (z) 1441  Maximum Likelihood Estimate(MLE) Method N/A  Gamma Distribution Test with Detected Values Only Gamma Statistics Not Available	DL/2 Substitution Method   Mean   -85.99		

1 1			o 9 distinct values may not be reliable. tions for accurate and meaningful results and estimate		
1 *					
			and Statistics		
• •	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	s Only	
1 3	Shapiro Wilk Test Statistic	0.954	Shapiro Wilk Test Statistic	0.962	
* 1	5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767	
	Data appear Normal at 5% Significance Lev	rel	Data appear Lognormal at 5% Significance Lognormal	evel	
	A N   Distribution		According Lower and Distribution		
	Assuming Normal Distribution		Assuming Lognormal Distribution		
	DL/2 Substitution Method		DL/2 Substitution Method		
•	Mean		Mean (Log Scale)		
	1	0.0452	SD (Log Scale)		
	95% UTL 90% Coverage		95% UTL 90% Coverage		
	95% UPL (t)	0.121	95% UPL (t)	0.0957	
1 1	90% Percentile (z)	0.101	90% Percentile (z)	0.0729	
1	95% Percentile (z)	0.117	95% Percentile (z)	0.091	
	99% Percentile (z)		99% Percentile (z)		
	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	0.05.10	
			Mean in Original Scale		
			SD in Original Scale		
			Mean in Log Scale		
			SD in Log Scale	0.236	
,			95% UTL 90% Coverage	0.0804	
			95% UPL (t)	0.0794	
4 7			90% Percentile (z)	0.0715	
			95% Percentile (z)		
٠.			99% Percentile (z)		
			``,		
4 1	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values C	Only	
	k star (bias corrected)	N/A	Data appear Normal at 5% Significance Leve	el	
	Theta Star	N/A	Jan 19 Ja		
1 0	nu star	N/A			
3 1	516.				
3 1	A-D Test Statistic	N/A	Nonparametric Statistics		
1 1	5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method		
	K-S Test Statistic	N/A		0.0812	
3 1		N/A N/A			
3 4	5% K-S Critical Value			0.0028	
1 1	Data not Gamma Distributed at 5% Significance	Level	SE of Mean		
			95% KM UTL with 90% Coverage		
	Assuming Gamma Distribution		95% KM Chebyshev UPL		
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)		
	Mean	N/A	90% Percentile (z)		
	Median	N/A	95% Percentile (z)	0.086	
1 1	SD	N/A	99% Percentile (z)	0.0879	
7	k star	N/A	``		
	Theta star	N/A	Gamma ROS Limits with Extrapolated Data	а	
	Nu star	N/A	95% Wilson Hilferty (WH) Approx. Gamma UPL	N/A	
	95% Percentile of Chisquare (2k)	N/A	95% Hawkins Wixley (HW) Approx. Gamma UPL	N/A	
	55 75 1 51 551 MIO OT OTHOGRAPIO (ER)		95% WH Approx. Gamma UTL with 90% Coverage	N/A	
	90% Percentile	N/A	95% HW Approx. Gamma UTL with 90% Coverage	N/A	
	95% Percentile	N/A	55 /5 1147 / Approx. Gamma 6 12 with 56 /6 Coverage	14774	
	99% Percentile	N/A			
. ,	5576 F Greentile				
	Note: DL/2 is not a recommended method.				
1					
	M MG/KG SILVER  (so_sb)				
1		Genera	I Statistics		
	Number of Valid Data		Number of Detected Data	0	
	Number of Distinct Detected Data		Number of Non-Detect Data		

Y		h	
			refore all statistics and estimates should also be NDs!
			stics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternat	ive site	e specific v	alues to estimate environmental parameters (e.g., EPC, B
The data set for val	riable N	MIMG/KG	SILVER  (so_sb) was not processed!
M MG/KG SILVER  (so_ss)			
			Statistics
Number of Valid			Number of Detected Data 0
Number of Distinct Detected	d Data	0	Number of Non-Detect Data 115
			refore all statistics and estimates should also be NDs!
			stics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternat	ive site	e specific v	alues to estimate environmental parameters (e.g., EPC, B
The data set for val	riable N	MIMG/KG	SILVER  (so_ss) was not processed!
M MG/KG SODIUM  (br_na)			
			Statistics
Number of Valid			Number of Detected Data 24
Number of Distinct Detected	d Data	24	Number of Non-Detect Data 6
Tolerance	Factor	1.777	Percent Non-Detects 20.00
Raw Statistics			Log-transformed Statistics
Minimum De	tected	62.4	Minimum Detected 4.134
Maximum De	tected	354	Maximum Detected 5.869
Mean of De	tected	160.4	Mean of Detected 4.951
SD of De	tected	85.2	SD of Detected 0.51
Minimum Non-	Detect	48.3	Minimum Non-Detect 3.877
Maximum Non-	Detect	50.5	Maximum Non-Detect 3.922
Data with Multiple Detection Lin	nits		Single Detection Limit Scenario
Note: Data have multiple DLs - Use of KM Met	hod is	recommen	Number treated as Non-Detect with Single DL 6
For all methods (except KM, DL/2, and ROS M		s),	Number treated as Detected with Single DL 24
Observations < Largest ND are treated as NDs	s		Single DL Non-Detect Percentage 20.00
	l	Backgroun	d Statistics
Normal Distribution Test with Detected	Values	Only	Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test S			Shapiro Wilk Test Statistic 0.96
5% Shapiro Wilk Critical	Value	0.916	5% Shapiro Wilk Critical Value 0.916
Data not Normal at 5% Significance	e Leve	Ì	Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution	n		Assuming Lognormal Distribution
DL/2 Substitution M			DL/2 Substitution Method
	Mean	133.2	Mean (Log Scale) 4.601
	SD	93.88	SD (Log Scale) 0.845
95% UTL 90% Cov	verage	300	95% UTL 90% Coverage 447
	JPL (t)	295.4	95% UPL (t) 428.6
95% L	tile (z)	253.5	90% Percentile (z) 294
95% U 90% Percen			95% Percentile (z) 399.7
	itile (z)	287.6	
90% Percen			99% Percentile (z) 711.1
90% Percen 95% Percen			99% Percentile (z) 711.1
90% Percen 95% Percen	tile (z)		99% Percentile (z) 711.1  Log ROS Method
90% Percen 95% Percen 99% Percen	ntile (z)		
90% Percen 95% Percen 99% Percen	ntile (z) Method Mean	351.6	Log ROS Method
90% Percen 95% Percen 99% Percen	Method Mean SD	351.6 126.4 103.4	Log ROS Method  Mean in Original Scale 137.2
90% Percen 95% Percen 99% Percen Maximum Likelihood Estimate(MLE) N	Method Mean SD	351.6 126.4 103.4	Log ROS Method  Mean in Original Scale 137.2  SD in Original Scale 89.38

Six K-S Critical Value   0.179   SE 5   Mean Assuming Gamma Distribution   95% KM UTL with 90% Coverage   95% KM UTL with 90% Coverage   95% KM UTL with 90% Coverage   95% KM UTL with 90% Coverage   95% KM UTL with 90% Coverage   95% KM UTL with 90% Coverage   95% KM UTL with 90% Coverage   95% KM UTL with 90% Coverage   95% Percentile (2 SD 100.1 99% Percentile (2 SD	
Soft Percentile (z)   268.9   Soft Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   173.9   Data appear Gamma Distribution Test with Detected Values on the control of the	1 249 2
S9% Percentile (z)   296.5   95% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   99% Percentile (z)   15.22   15.22   15.23   15	
Gamma Distribution Test with Detected Values Only k stor (bias corrected) 3.622 Theta Star 44.28 nu star 173.9  A-D Test Statistic 0.466 Nonparametric Statistics S% A-D Critical Value 0.748 Kaplan-Meier (KM) Method K-S Test Statistic 0.138 S% K-S Critical Value 0.179 Star Star 183.3 Data appear Gamma Distributed at 5% Significance Level  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean 128.3 Median 109.5 Mean 109.5 Mean 128.3 Median 109.5 Mean 128.3 Median 109.5 Mean 128.3 Median 109.5 Mean 128.3 Median 109.5 Mean 128.3 Median 109.5 Mean 128.3 Median 109.5 Mean 128.3 Median 109.5 Mean 128.3 Median 109.5 Mean 128.3 Median 128.9 Mean 128.3 Mean 128.9 Mean 128.9 Mean 128.3 Mean 128.9 Mean 128	
Gamma Distribution Test with Detected Values Only  k star (bias corrected) 3.622 Theta Start 44.28 The Start 4	
These star (bias corrected) 3.622 These Star (bias corrected) 3.622 These Star (bias corrected) 3.622 The Star (bias corrected	) 516
These star (bias corrected) 3.622 These Star (bias corrected) 3.622 These Star (bias corrected) 3.622 The Star (bias corrected	
Theta Star   42.8   173.9    A-D Test Statistic   0.466   Nonparametric Statistics    Six A-D Critical Value   0.748   Kaptan-Meier (KM) Methor    K-S Test Statistic   0.138   Kaptan-Meier (KM) Methor    Six K-S Critical Value   0.179   St.    Data appear Gamma Distributed at 5% Significance Level   95% KM UTL with   90% Coverage    Assuming Gamma Distribution   95% KM UPL with   90% Coverage    Assuming Gamma Distribution   95% KM UPL    Gamma ROS Statistics with Extrapolated Data   95% KM UPL    Median   103.5   95% Percentilie   2    Median   103.5   95% Percentilie   2    Median   103.5   95% Percentilie   2    Median   103.5   95% Percentilie   2    Median   103.5   95% Percentilie   2    Median   103.5   95% Percentilie   2    Median   103.5   95% Percentilie   2    Median   103.5   95% Percentilie   2    Median   103.5   95% Percentilie   2    Median   103.5   95% Percentilie   2    Median   103.5   95% Percentilie   2    Muster   2.19   95% Wilson Hilferty (WH) Approx. Gamma UPL    95% Percentile of Chisquare (2k)   2.095   95% Hawkins Winkley (HW) Approx. Gamma UTL    95% WHA Approx. Gamma UTL with   90% Coverage   95% WHA Approx. Gamma UTL with   90% Coverage   95% WHA Approx. Gamma UTL with   90% Coverage   95% WHA Approx. Gamma UTL with   90% Coverage   95% WHA Approx. Gamma UTL with   90% Coverage   95% WHA Approx. Gamma UTL with   90% Coverage   95% WHA Approx. Gamma UTL with   90% Coverage   95% WHA Approx. Gamma UTL    Note: DL/2 is not a recommended method.  MIMG/KG SODIUM  (so_sb)  General Statistics  Number of District Detected Data   100	
A-D Test Statistic   0.466   Nonparametric Statistics   5% A-D Critical Value   0.738   Kaplan-Meier (KM) Method   K-S Test Statistic   0.138   Kaplan-Meier (KM) Method   K-S Test Statistic   0.138   Mean   K-S Test Statistic   0.138   Mean	ice Level
A-D Test Statistic 0.466 Nonparametric Statistics  5% A-D Critical Value 0.748 Kaplan-Meier (KM) Methor K-S Test Statistics 0.138 Mean Sw K-S Critical Value 0.779 St St Data appear Gamma Distributed at 5% Significance Level 95% KM UTL with 90% Coverage 95% KM UTL with 90% Coverage 95% KM UTL with 90% Coverage 95% KM UTL with 90% Coverage 95% KM UTL with 90% Coverage 95% KM UTL with 90% Coverage 95% KM UTL with 90% Coverage 95% KM UTL with 90% Coverage 95% KM UTL with 90% Coverage 95% KM UTL with 90% Coverage 95% Percentile (2 St 95% KM UTL of 95% Percentile (2 St 95% KM UTL of 95% Percentile (2 St 95% M UTL of 95% Percentile (2 St	
S% A-D Critical Value   0.748	
S% A-D Critical Value   0.748	
Minimum Detected Data   Statistics   Stati	
Minimum Detected Data   Second Statistics   Second Maximum Non-Detect Data   Second Maximum Non-Detect Data   Second Maximum Non-Detect Data   Second Statistics   Second Maximum Non-Detect Data   Second Maximum Non-Detect Data   Second Maximum Non-Detect Data   Second Maximum Non-Detect Data   Second Maximum Non-Detect Data   Second Maximum Non-Detect Data   Second Maximum Detected Values Only Shapiro Wilk Test Statistics   Single Data appear Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistics   Second Maximum Detected Values Only Shapiro Wilk Test Statistics   Second Method   Second M	b
Data appear Gamma Distributed at 5% Significance Level   SE of Meas	n 140.8
Data appear Gamma Distributed at 5% Significance Level   SE of Meas	84.27
Assuming Gamma Distribution   95% KM Unity Splave UP	
Assuming Gamma Distribution   95% KM Chebyshev LPI	
Gamma ROS Statistics with Extrapolated Data Median 109.5 Median 10.1 Median	
Mean   128.3   90% Percentile (z   Nedian   109.5   95% Percentile (z   SD   100.1   99% Percentile (z   k star   0.203   Theta star   631.5   Gamma ROS Limits with Extrapolated De	
Median   109.5   95% Percentile   2	
SD   100.1   99% Percentile (z k star   0.203   100.1   100.	
Right   State   County   State   County   State   County   State   County   State   County   State   County   State   County   State   County   State   County   State   Sta	
Theta star   631.5   Gamma ROS Limits with Extrapolated De Nu star   12.19   95% Wilson Hilferty (WH) Approx. Gamma UPI   95% Percentile of Chisquare (2k)   2.085   95% Hawkins Wilkey (HIV) Approx. Gamma UPI   95% WH Approx. Gamma UPI   95% WH Approx. Gamma UPI   95% WH Approx. Gamma UTL with   90% Coverage   95% Percentile   658.4   95% Percentile   1401   95% WH Approx. Gamma UTL with   90% Coverage   95% Percentile   1401   95% WH Approx. Gamma UTL with   90% Coverage   95% Percentile   1401   95% WH Approx. Gamma UTL with   90% Coverage   95% WH Approx. Gamma UTL with   90% Cove	) 336.8
Nu star   12.19   95% Wilson Hilferty (WH) Approx. Gamma UPI   95% Percentile of Chisquare (2k) 2.085   95% Hawkins Wixley (HW) Approx. Gamma UPI   95% WHApprox. Gamma UPI   95% WHApprox. Gamma UTL with   90% Coverage   90% Percentile   588.4   95% HW Approx. Gamma UTL with   90% Coverage   95% WHApprox. Gamma UTL with   90% Coverage   95% WHApprox. Gamma UTL with   90% Coverage   95% HW Approx. Gamma Utle	
95% Percentile of Chisquare (2k)   2.085   95% Hawkins Wixley (HW) Approx. Gamma UTL with   90% Coverage   95% WH Approx. Gamma UTL with   90% Coverage   95% Percentile   388.1   95% HW Approx. Gamma UTL with   90% Coverage   95% Percentile   1401   95% HW Approx. Gamma UTL with   90% Coverage   95% Percentile   1401   95% HW Approx. Gamma UTL with   90% Coverage   95% Percentile   1401   95% HW Approx. Gamma UTL with   90% Coverage   95% Hawkins Wixley (HW) Approx. Gamma UTL with   90% Coverage   95% Hawkins Wixley (HW) Approx. Gamma UTL with   90% Coverage   95% Hawkins Wixley (HW) Approx. Gamma UTL with   90% Coverage   95% Hawkins Wixley (HW) Approx. Gamma UTL with   90% Coverage   95% Hawkins Ut   95% HW Approx. Gamma UTL with   90% Coverage   95% Hawkins Ut   95% HW Approx. Gamma UTL with   90% Coverage   95% Hawkins Ut   95% HW Approx. Gamma UTL with   90% Coverage   95% Hawkins Ut   95% HW Approx. Gamma UTL with   90% Coverage   95% Hawkins Ut   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% Hawkins Ut   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% HW Approx. Gamma UTL with   90% Coverage   95% Happrox Unit   90% Coverage   95% Happrox Unit   90% Coverage   95% Happrox Unit   90% Coverage   95% Happrox Unit   90% Coverage   95% Happrox Unit   90% Coverage   95% Happrox Unit   90% Coverage   95% Happrox Unit   90% Coverage   90% Happrox Unit   90% Coverage   90% Happrox Unit   90% Coverage   90% Happrox Unit   90% Coverage   9	ıta
95% WH Approx. Gamma UTL with 90% Coverage 90% Percentile 388.1 95% HW Approx. Gamma UTL with 90% Coverage 95% Percentile 658.4 99% Percentile 1401  Note: DL/2 is not a recommended method.  MIMG/KG SODIUM  (so_sb)  General Statistics  Number of Valid Data 100 Number of Detected Data 31 Number of Non-Detect Data 70 Number of Distinct Detected Data 31 Number of Non-Detect Data 70 Percent Non-Detect Data 70 Percent Non-Detect Data 70 Percent Non-Detect Data 70 Percent Non-Detect 94.1 Maximum Detected 10.7 Maximum Detected 10.7 Maximum Detected 10.7 Mean of Detected 14.8.6 SD of Detected 14.8.6 SD of Detected 14.8.6 SD of Detected 14.8.6 SD of Detected 14.8.6 SD of Detected 14.8.6 SD of Detected 14.8.6 SD of Detected 14.8.6 SD of Detected 14.8.6 SD of Detected 14.8.6 SD of Detected 15.8 Maximum Non-Detect 15.8 Maxi	_ 549.3
90% Percentile   388.1   95% HW Approx. Gamma UTL with   90% Coverage   95% Percentile   568.4   99% Percentile   1401	
Note: DL/2 is not a recommended method.	€ 572.6
Note: DL/2 is not a recommended method.    MIMG/KG SODIUM  (so_sb)	e 834.8
Note: DL/2 is not a recommended method.	
Note: DL/2 is not a recommended method.	
Number of Valid Data Number of Distinct Detected Data Number of Distinct Detected Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics    Continued Detected Data   1.524   1.524   1.524	
Number of Distinct Detected Data Tolerance Factor    Tolerance Factor   1.524   Percent Non-Detect Data   Tolerance Factor   1.524   Percent Non-Detect	
Tolerance Factor   1.524   Percent Non-Detects	a 33
Raw Statistics  Minimum Detected Maximum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect SD of Detected Maximum Non-Detect Maximum Non-D	a 67
Minimum Detected 54.1 Minimum Detected Maximum Detected 107 Maximum Detected 74.73 Mean of Detected 54.1 Mean of Detected 54.73 Mean of Detected 55.8 SD of Detected Minimum Non-Detect 55.8 Minimum Non-Detect 74.3 Maximum N	s 67.00%
Minimum Detected 54.1 Minimum Detected Maximum Detected 107 Maximum Detected 74.73 Mean of Detected 54.1 Mean of Detected 54.73 Mean of Detected 55.8 SD of Detected Minimum Non-Detect 55.8 Minimum Non-Detect 74.3 Maximum N	
Maximum Detected Mean of Detected Mean of Detected Mean of Detected SD of Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Mumber treated as Non-Detected Value Mumber treated as Non-Detect vith Single Dia Mumber treated as Non-Detect vith Single Dia M	
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SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Mumber treated as Non-Detect with Single DI Number treated as Detected with Single DI Non-Detect Percentage  Background Statistics  Normal Distribution Test with Detected Value Shapiro Wilk Test Statistic Maximum Non-Detect Number treated as Non-Detect with Single DI Number treated as Detected with Single DI Number treated as Non-Detect with Single DI Number treated as Detected with Single DI Number treated as Non-Detect with Single DI Number treated as Detected with Single DI Number treated as Non-Detect with Single DI	
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Maximum Non-Detect 74.3  Number treated as Non-Detect with Single Di Number treated as Non-Detect with Sing	
Data with Multiple Detection Limits  Note: Data have multiple DLs - Use of KM Method is recommen For all methods (except KM, DL/2, and ROS Methods), Observations < Largest ND are treated as NDs  Background Statistics  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level  Assuming Normal Distribution Method  DL/2 Substitution Method Mean   43.48  Single Detection Limit Scenario Number treated as Non-Detect with Single Dl Number treated as Detected with Single Dl Number treated as Detected with Single Dl Number treated as Detected with Single Dl Number treated as Non-Detect wi	
Note: Data have multiple DLs - Use of KM Method is recommental For all methods (except KM, DL/2, and ROS Methods),  Observations < Largest ND are treated as NDs  Background Statistics  Normal Distribution Test with Detected Values Only  Shapiro Wilk Test Statistic  5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Level  Assuming Normal Distribution Method  DL/2 Substitution Method  Mean   43.48  Number treated as Non-Detect with Single DL  Number treated as Non-Detect with Single DL  Number treated as Non-Detect with Single DL  Number treated as Non-Detect with Single DL  Number treated as Non-Detect with Single DL  Number treated as Non-Detect with Single DL  Number treated as Non-Detect with Single DL  Number treated as Non-Detect with Single DL  Number treated as Non-Detect with Single DL  Number treated as Non-Detect with Single DL  Number treated as Non-Detect with Single DL  Single DL Non-Detect Percentage  Lognormal Distribution Test with Detected Value O.939  Shapiro Wilk Test Statistic  Data appear Lognormal at 5% Significance Detected Value O.931  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale	+
Note: Data have multiple DLs - Use of KM Method is recommental For all methods (except KM, DL/2, and ROS Methods), Number treated as Detected with Single DL Non-Detect Percentage    Background Statistics  Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic    Shapiro Wilk Test Statistic    Data appear Normal at 5% Significance Level    Assuming Normal Distribution Method    DL/2 Substitution Method    Mean   43.48    Number treated as Non-Detect with Single DL Non-Detect Percentage    Number treated as Non-Detect with Single DL Non-Detect Percentage    Number treated as Non-Detect with Single DL Non-Detect Percentage    Number treated as Non-Detect with Single DL Non-Detect Percentage    Number treated as Non-Detect with Single DL Non-Detect Percentage    Number treated as Non-Detect with Single DL Non-Detect Percentage    Number treated as Non-Detect with Single DL Non-Detect Percentage    Single DL Non-Detect Percentage    Lognormal Distribution Test with Detected Value    Non-Detect With Single DL Non-Detect With	
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Normal Distribution Test with Detected Values Only Shapiro Wilk Test Statistic 0.939 Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value 0.931 Shapiro Wilk Critical Value 0.931 Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value 0.931 Data appear Normal at 5% Significance Level Data appear Lognormal at 5% Significance I  Assuming Normal Distribution DL/2 Substitution Method Mean 43.48  Nean (Log Scale	L 16
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5% Shapiro Wilk Critical Value 0.931 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level Data appear Lognormal at 5% Significance I Data appear Lognormal at 5% Significance I Data appear Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method DL/2 Substitution Method Mean 43.48 Mean (Log Scale	L 16 e 84.00%
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Assuming Normal Distribution  DL/2 Substitution Method  Mean 43.48  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale	16 84.00%  les Only  c 0.946
DL/2 Substitution Method DL/2 Substitution Method Mean 43.48 Mean (Log Scale	L 16 e 84.00% les Only c 0.946 e 0.931
DL/2 Substitution Method DL/2 Substitution Method Mean 43.48 Mean (Log Scale	L 16 e 84.00% les Only c 0.946 e 0.931
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	L 16 e 84.00% les Only c 0.946 e 0.931 Level
CD // aa Caala	L 16 e 84.00%  les Only c 0.946 e 0.931  Level
SD 23.65 SD (Log Scale	les Only 10 0.946 10 0.931 11 0.946 12 0.931 13 0.931
95% UTL 90% Coverage 79.53 95% UTL 90% Coverage	L 16  Be 84.00%  Bes Only  C 0.946  D 0.931  Bes Only  C 0.946  D 0.931

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•	95% UPL (t)	82 95	95% UPL (t)	84 46
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
1 1	99% Percentile (z)		99% Percentile (z)	
1 7	33 % T ercertile (2)	30.3	33 % Fercentile (2)	113.1
. 1	Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
	Mean		Mean in Original Scale	52 57
		23.87	SD in Original Scale	
	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	30% CTE Will 00% COVOINGE	07.2	95% BCA UTL with 90% Coverage	
			95% Bootstrap (%) UTL with 90% Coverage	
	95% UPL (t)	90.65	95% UPL (t)	
	90% Percentile (z)	81 41	90% Percentile (z)	
1	95% Percentile (z)		95% Percentile (z)	
1	99% Percentile (z)		99% Percentile (z)	
,	33 % 1 Crocritic (2)	100.4	33701 Greentile (2)	101.2
	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values 0	)nlv
	k star (bias corrected)		Data appear Normal at 5% Significance Leve	
3	Theta Star		Data appear Normal at 5% Significance Levi	CI
+	nu star			
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	A-D Test Statistic	0.511	Nannoromatria Otatiatiaa	
-			Nonparametric Statistics	
3	5% A-D Critical Value		Kaplan-Meier (KM) Method	
7	K-S Test Statistic		Mean	
,	5% K-S Critical Value			12.81
,	Data appear Gamma Distributed at 5% Significan	ce Level	SE of Mean	
Ţ	A 1 0 DI II II		95% KM UTL with 90% Coverage	
1	Assuming Gamma Distribution	I	95% KM Chebyshev UPL	
,	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
	Mean		90% Percentile (z)	
	Median		95% Percentile (z)	
_		35.36	99% Percentile (z)	90.79
_	k star			
,	Theta star		Gamma ROS Limits with Extrapolated Date	
	Nu star	-	95% Wilson Hilferty (WH) Approx. Gamma UPL	
	95% Percentile of Chisquare (2k)	1.17	95% Hawkins Wixley (HW) Approx. Gamma UPL	148.2
		1 -	95% WH Approx. Gamma UTL with 90% Coverage	
1	90% Percentile		95% HW Approx. Gamma UTL with 90% Coverage	118.3
_	95% Percentile	153 7		
1				
*	99% Percentile			
· ·				
* • • • • • • • • • • • • • • • • • • •	99% Percentile			
1	99% Percentile			
1	99% Percentile  Note: DL/2 is not a recommended method.	418.9	Statistics	
,	99% Percentile  Note: DL/2 is not a recommended method.	418.9  General	Statistics  Number of Detected Data	25
,	99% Percentile  Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)	418.9 <b>General</b> 115		
,	99% Percentile  Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)  Number of Valid Data	418.9  General 115 25	Number of Detected Data	90
1	99% Percentile  Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor	418.9  General 115 25	Number of Detected Data Number of Non-Detect Data Percent Non-Detects	90
1	99% Percentile  Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics	General 115 25 1.506	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics	90
,	99% Percentile  Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected	General 115 25 1.506	Number of Detected Data Number of Non-Detect Data Percent Non-Detects	90
1	99% Percentile  Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected	General 115 25 1.506 62.3 349	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics	90
1	99% Percentile  Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected	General 115 25 1.506 62.3 349 177.5	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics	90
,	Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected Mean of Detected	General 115 25 1.506 62.3 349 177.5 177.5	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics	90
1	Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected	General 115 25 1.506  62.3 349 177.5 177.5	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics	90
,	Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected Mean of Detected	General 115 25 1.506  62.3 349 177.5 177.5	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics	90
,	Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Maximum Non-Detect	General 115 25 1.506  62.3 349 177.5 177.5	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Log Statistics Not Avaliable	90
· P	Note: DL/2 is not a recommended method.  MIMG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Maximum Non-Detect	General 115 25 1.506  62.3 349 177.5 177.5 177.5	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Log Statistics Not Avaliable  Single Detection Limit Scenario	90 78.26
	Note: DL/2 is not a recommended method.  M MG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Maximum Non-Detect  Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is	General 115 25 1.506  62.3 349 177.5 177.5 177.5 814	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Log Statistics Not Avaliable  Single Detection Limit Scenario Number treated as Non-Detect with Single DL	90 78.269
, , , , , , , , , , , , , , , , , , ,	Note: DL/2 is not a recommended method.  MIMG/KG SODIUM  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor  Raw Statistics Minimum Detected Maximum Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Mean of Detected Maximum Non-Detect	General 115 25 1.506  62.3 349 177.5 177.5 177.5 814	Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Log Statistics Not Avaliable  Single Detection Limit Scenario	90 78.269

	У Р С В	,		
	<u> </u>	Backgrour	nd Statistics	
	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	s Only
	Shapiro Wilk Test Statistic		Not Available	
	5% Shapiro Wilk Critical Value			
# 1	Data not Normal at 5% Significance Leve			
	Data flot Normal at 6% digitalisation 2010	•		
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	DL/2 Substitution Method		DL/2 Substitution Method	N/A
	Mean	-1145	BEIZ Gaboutation Motified	
		2198		
	95% UTL 90% Coverage			
	95% UPL (t)			
	90% Percentile (z)			
	95% Percentile (z)			
* 1	99% Percentile (z)			
	33 70 1 Crocritic (2)	3300		
	Maximum Likelihood Estimate(MLE) Method	Ν/Δ	Log ROS Method	NI/A
	Waximum Likelinood Estimate(WEE) Wethod	IV/A	Log NOS Method	IN/A
	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values C	)nlv
	Gamma Statistics Not Available	Oilly	Data follow Appr. Gamma Distribution at 5% Significa	
	Gaillilla Statistics Not Available		Data follow Appr. Garrina Distribution at 5 % Significa	iiice Lev
	4			
	4		Nonparametric Statistics	
	+		Kaplan-Meier (KM) Method	
			Mean	00 71
				85.62
			SE of Mean	
			95% KM UTL with 90% Coverage	
			95% KM Chebyshev UPL	
			95% KM UPL (t)	
, ,			90% Percentile (z)	
			95% Percentile (z)	
			99% Percentile (z)	287.9
9 1	Note: DL/2 is not a recommended method.			
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1 *	1			
	TAIMO///OITHALLIHM//bs/ max			
	M MG/KG THALLIUM  (br_na)			
	MIMG/KG THALLIUM  (br_na)			
1.1	MIMG/KG THALLIUM  (br_na)	General	Statistics	
1 1	Number of Valid Data		Number of Detected Data	
1 1		30	Number of Detected Data	
11	Number of Valid Data	30		
1 1	Number of Valid Data  Number of Distinct Detected Data	30	Number of Detected Data	30
1 1 1	Number of Valid Data Number of Distinct Detected Data Warning: All observations are Non-Detects	30 0 (NDs), the	Number of Detected Data Number of Non-Detect Data	30 s!
1 1	Number of Valid Data Number of Distinct Detected Data Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and	30 0 (NDs), the	Number of Detected Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND	30 s! imit!
1 1	Number of Valid Data Number of Distinct Detected Data Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and	30 0 (NDs), the	Number of Detected Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND Stics are also NDs lying below the largest detection lies.	30 s! imit!
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site	30 0 (NDs), the other stati	Number of Detected Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND Stics are also NDs lying below the largest detection lies.	30 s! imit!
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site	30 0 (NDs), the other stati	Number of Detected Data Number of Non-Detect Data Prefore all statistics and estimates should also be ND Stics are also NDs lying below the largest detection lively alues to estimate environmental parameters (e.g., E	30 s! imit!
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site	30 0 (NDs), the other stati	Number of Detected Data Number of Non-Detect Data Prefore all statistics and estimates should also be ND Stics are also NDs lying below the largest detection lively alues to estimate environmental parameters (e.g., E	30 s! imit!
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site	30 0 (NDs), the other stati	Number of Detected Data Number of Non-Detect Data Prefore all statistics and estimates should also be ND Stics are also NDs lying below the largest detection lively alues to estimate environmental parameters (e.g., E	30 s! imit!
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site	30 0 (NDs), the other stati	Number of Detected Data Number of Non-Detect Data Prefore all statistics and estimates should also be ND Stics are also NDs lying below the largest detection lively alues to estimate environmental parameters (e.g., E	30 s! imit!
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M	(NDs), the other static specific v	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection invalues to estimate environmental parameters (e.g., E HALLIUM  (br_na) was not processed!	30 s! imit!
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M	(NDs), the other static specific v	Number of Detected Data Number of Non-Detect Data Prefore all statistics and estimates should also be ND Stics are also NDs lying below the largest detection lively alues to estimate environmental parameters (e.g., E	30 s! imit!
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M  M MG/KG THALLIUM  (so_sb)	(NDs), the other statice specific value (MG/KG T)  General	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection livalues to estimate environmental parameters (e.g., E HALLIUM  (br_na) was not processed!  Statistics  Number of Detected Data	30 s! imit! PC, BT
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M	(NDs), the other statice specific value (MG/KG T)  General	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection livalues to estimate environmental parameters (e.g., E HALLIUM  (br_na) was not processed!  Statistics	30 s! imit! PC, BT
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M  M MG/KG THALLIUM  (so_sb)  Number of Valid Data Number of Distinct Detected Data	(NDs), the other statice specific value (MG/KG T)  General 100	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection livalues to estimate environmental parameters (e.g., E HALLIUM  (br_na) was not processed!  Statistics  Number of Detected Data Number of Non-Detect Data	30 s! imit! PC, BT
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M  M MG/KG THALLIUM  (so_sb)  Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects	(NDs), the other statice specific value of the statice of the specific value of the static of the statice of the static of th	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection invalues to estimate environmental parameters (e.g., E HALLIUMI (br_na) was not processed!  Statistics  Number of Detected Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND	30 s! imit! PC, BT
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M  M MG/KG THALLIUM  (so_sb)  Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and	(NDs), the other statice specific value of the statice specific value of the static of	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection invalues to estimate environmental parameters (e.g., E HALLIUM  (br_na) was not processed!  Statistics  Number of Detected Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection in	30 s! imit! PC, BT
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M  M MG/KG THALLIUM  (so_sb)  Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and	(NDs), the other statice specific value of the statice specific value of the static of	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection invalues to estimate environmental parameters (e.g., E HALLIUMI (br_na) was not processed!  Statistics  Number of Detected Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND	30 s! imit! PC, BT
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M  M MG/KG THALLIUM  (so_sb)  Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and	(NDs), the other statice specific value of the statice specific value of the static of	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection invalues to estimate environmental parameters (e.g., E HALLIUM  (br_na) was not processed!  Statistics  Number of Detected Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection in	30 s! imit! PC, BT
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M  MIMG/KGITHALLIUMI (so_sb)  Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site	(NDs), the other statice specific value of the static of the statice of the stati	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection invalues to estimate environmental parameters (e.g., E HALLIUM  (br_na) was not processed!  Statistics  Number of Detected Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection in	30 s! imit! PC, BT
	Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site  The data set for variable M  MIMG/KGITHALLIUMI (so_sb)  Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative site	(NDs), the other statice specific value of the static of the statice of the stati	Number of Detected Data Number of Non-Detect Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection livalues to estimate environmental parameters (e.g., E HALLIUM  (br_na) was not processed!  Statistics  Number of Detected Data Number of Non-Detect Data Perefore all statistics and estimates should also be ND stics are also NDs lying below the largest detection livalues to estimate environmental parameters (e.g., E	30 s! imit! PC, BT

1 .		,	q			1		r	,
1 1				ļ	Į.				
ММ	G/KG THALLIUM  (so_ss)								
		General	Statistics						
* 1	Number of Valid Data						f Detecte		
• •	Number of Distinct Detected Data	0			Number	r of N	on-Dete	ct Data	115
	Wantan Allahamadan an Nas Batada	(AID-) III-						. l NIF	\_1
	Warning: All observations are Non-Detects								
· · The F	Specifically, sample mean, UCLs, UPLs, and Project Team may decide to use alternative site								
111er	Floject Team may decide to use alternative site	e specific v	raiues to es	umate em	ii Oi ii i lei i la	ı para	ameters	(e.y., c	.РС, В
* *	The data set for variable M	IMG/KGITI	HALLIUMI (	so ss) wa	s not proce	2556	dl		
		J G 1 C			p. cc.				
3 *									
1 1									
MIMO	G/KG VANADIUM  (br_na)								
3 9									
			Statistics						
2 4	Total Number of Observations			N	umber of D	)istin	ct Obser	vations	30
1 1	Tolerance Factor	1.///							
. *	Raw Statistics			Lon	-Transforn	ned S	Statistics	<u> </u>	
1 *	Minimum	0.62		Log	Transioni			, inimum	-0.478
	Maximum							aximum	
	Second Largest	18.7					Second I	Largest	2.929
. ,	First Quartile	5.925					First (	Quartile	1.779
1	Median	7.7						Median	2.041
,	Third Quartile	11.48					Third (	Quartile	
		9.699							2.064
		6.603						SD	0.718
	Coefficient of Variation								
	Skewness	2.279							
		Rackgroup	nd Statistics						
* 1	Normal Distribution Test	Dackgroun	iu Otatiotico		normal Dis	tribu	tion Tes	t	
* 1	Shapiro Wilk Test Statistic	0.814		9			ilk Test S		0.911
4 1	Shapiro Wilk Critical Value						lk Critica		
	Data not Normal at 5% Significance Leve		Da	ata not Log	normal at	5% S	Significa	nce Lev	el
	Assuming Normal Distribution	T			ing Logno				
	95% UTL with 90% Coverage				95% UTL \				
	95% UPL (t)						95%		
	90% Percentile (z) 95% Percentile (z)						% Perce	. ,	
	99% Percentile (z)						% Perce		
	55 % 1 Greentile (2)					33		(2)	
1	Gamma Distribution Test			С	ata Distrib	oution	n Test		
, ,	k star		Data app	ear Gamn	na Distribu	ted a	t 5% Siç	nifican	ce Lev
	Theta Star								
	MLE of Mean								
	MLE of Standard Deviation								
	nu star	139.4							
	A-D Test Statistic	0.449		NI.	nparameti	rio Sª	atietics		
	5% A-D Critical Value			INC	ı ıpaı ai i i <del>e</del> ti		90% Pe	rcentile	16 12
	K-S Test Statistic						95% Pe		
	5% K-S Critical Value						99% Pe		
Dat	ta appear Gamma Distributed at 5% Significan								
	· ·								
	Assuming Gamma Distribution				95% UTL ν				
	90% Percentile			entile Boots					
	95% Percentile		95%	BCA Boots	strap UTL v	with			
	99% Percentile	30.18						% UPL	
1 0								ev UPL	00

	у в с в	h	0 E ! ) K	r
, ,	95% WH Approx. Gamma UPL	22.25	Upper Threshold Limit Based upon IQR	10 R
	95% WT Approx. Gamma UPL		Opper Threshold Little Based upon IQN	13.0
7	95% WH Approx. Gamma UTL with 90% Coverage	22.34		
,	95% HW Approx. Gamma UTL with 90% Coverage	23.53		
	35 % TIW Approx. Gaillina OTE with 90 % Coverage	25.55		
•				
-	M MG/KG VANADIUM  (so_sb)			
		0	On all all an	
	Total Number of Observations	General 100	Statistics  Number of Distinct Observations	73
1	Tolerance Factor		Number of Distinct Observations	73
7				
	Raw Statistics		Log-Transformed Statistics	0.450
	Minimum		Minimum	
3	Maximum		Maximum	
	Second Largest First Quartile		Second Largest First Quartile	
	First Quartile Median		First Quartile Median	
٠	Median Third Quartile	-	Third Quartile	
		16.85	Mean	
3		3.681		0.225
1	Coefficient of Variation		30	0.223
1	Skewness			
1	Normal Distribution Test	Backgroun	d Statistics  Lognormal Distribution Test	
	Lilliefors Test Statistic	0.084	Lilliefors Test Statistic	0 0969
	Lilliefors Critical Value		Lilliefors Critical Value	
	Data appear Normal at 5% Significance Lev		Data not Lognormal at 5% Significance Lev	
1	Assuming Normal Distribution		Assuming Lognormal Distribution	
1	95% UTL with 90% Coverage	22.46	95% UTL with 90% Coverage	22 10
,	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
٠	95% Percentile (z)		95% Percentile (z)	
3	99% Percentile (z)		99% Percentile (z)	
	,		( )	
*	Gamma Distribution Test		Data Distribution Test	
٠	k star		Data appear Normal at 5% Significance Lev	rel
	Theta Star			
1	MLE of Mean			
,	MLE of Standard Deviation nu star			
	nu star	4016		
٠	A-D Test Statistic		Nonparametric Statistics	
1	5% A-D Critical Value		90% Percentile	
	K-S Test Statistic		95% Percentile	
	5% K-S Critical Value  Data follow Appx. Gamma Distribution at 5% Signific		99% Percentile	26.62
	Sam Islion Appr. Gailling Distribution at 3 % Signific	AIICE LEVE		
1	Assuming Gamma Distribution		95% UTL with 90% Coverage	
1	90% Percentile		95% Percentile Bootstrap UTL with 90% Coverage	
,	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
	99% Percentile	26.81	95% UPL	
	270/1111	00.50	95% Chebyshev UPL	
	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	25.86
	95% HW Approx. Gamma UPL			
	95% WH Approx. Gamma UTL with 90% Coverage			
•	95% HW Approx. Gamma UTL with 90% Coverage	22.92		
3				
7				
•	M MG/KG VANADIUM  (so_ss)			
-				

	A E C D I	h	e e		-	1	*	r
		General	Statistics					
1 1	Total Number of Observations	115		N	lumber of	Distinct Ob	servations	91
	Tolerance Factor	1.506						
	Raw Statistics			Log	-Transfor	med Statis	tics	
	Minimum							1.649
* 1	Maximum						Maximum	
. ,	Second Largest						nd Largest	
	First Quartile					Fir	st Quartile	
	Median						Median	
	Third Quartile					Thi	rd Quartile	
	Mean						Mean	
		7.966					SD	0.485
	Coefficient of Variation							
	Skewness	-0.133						
. 1		Daaleman	d Otationics					
. 1	Normal Distribution Test	backgroun	d Statistics		normal Di	otribution 7	Foot	
	Lilliefors Test Statistic	0.0544		Log		stribution T		0 1/
	Lilliefors Critical Value					illiefors Cri		
	Data appear Normal at 5% Significance Lev		D	ata not l oc		t 5% Signif		
* 1	Data appear Normal at 5 % digililicance Lev	-01		ata not Log	jiioiiiiai a	. 570 Olgilli	icanice Lev	01
	Assuming Normal Distribution			Assum	ina Loana	ormal Distri	ibution	
	95% UTL with 90% Coverage	32.49				with 90%		38.53
	95% UPL (t)	33.76					5% UPL (t)	
	90% Percentile (z)						rcentile (z)	
1 1	95% Percentile (z)	33.59					rcentile (z)	
	99% Percentile (z)						rcentile (z)	
							, ,	
	Gamma Distribution Test					ibution Tes		
	k star	5.126	Da	ata appear	Normal a	t 5% Signif	icance Lev	/el
1 1	Theta Star							
	MLE of Mean							
	MLE of Standard Deviation	9.049						
	nu star	1179						
		0.101						
	A-D Test Statistic			No	onparame	tric Statisti		00.70
	5% A-D Critical Value						Percentile	
, ,	K-S Test Statistic						Percentile	
3 4	5% K-S Critical Value					99%	Percentile	35.16
1 1	Data not Gamma Distributed at 5% Significance	Level						
	Assuming Gamma Distribution				OE0/ LITI	with 000/	Coverage	21 E
1 +	90% Percentile	22.6	05% Porc			with 90% with 90%		
	95% Percentile					with 90%		
	99% Percentile		95%	וווווסם אייים	ouap UTL	vviui 30%	95% UPL	
1 1	33 % r ercentule	77.10				95% Cheby		
1 1	95% WH Approx. Gamma UPL	37 43		Unner T		imit Based		
. ,	95% HW Approx. Gamma UPL			орры 1	0011010 L		apon ron	13.70
9	95% WH Approx. Gamma UTL with 90% Coverage							
	95% HW Approx. Gamma UTL with 90% Coverage							
2			1					
· · · N	/I MG/KG ZINC  (br_na)							
		General	Statistics					
4 7	Total Number of Observations			N	lumber of	Distinct Ob	servations	30
	Tolerance Factor							
	Raw Statistics	<u> </u>		Log	-Transfor	med Statis		
4 3	Minimum	2.9					Minimum	
	Maximum						Maximum	

			0 N 1 1 E	
		07		4 400
	Second Largest		Second Largest	
	First Quartile		First Quartile	
	Median	-	Median	
1 * 1 1	Third Quartile	64.5	Third Quartile	4.167
	Mean	52.83	Mean	3.8
	SD	25.75	SD	0.705
	Coefficient of Variation	0.487		
	Skewness	0.548		
		Backgrour	nd Statistics	
	Normal Distribution Test		Lognormal Distribution Test	
	Shapiro Wilk Test Statistic	n 972	Shapiro Wilk Test Statistic	N 826
	Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	
* * 1	Data appear Normal at 5% Significance Lev		Data not Lognormal at 5% Significance Leve	
* * 1	Data appear Normal at 5 % Significance Lev	VCI	Data not Edgnormal at 5 % Significance Levi	CI
	Accuming Normal Distribution		Accuming Lognormal Distribution	
	Assuming Normal Distribution	00.50	Assuming Lognormal Distribution	450 F
	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)	112.7	99% Percentile (z)	230.5
* : *				
4 3 1	Gamma Distribution Test		Data Distribution Test	
4 3 3	k star	2.862	Data appear Normal at 5% Significance Lev	el
4 3 1	Theta Star	18.46		
* 3 *	MLE of Mean			
* 1 *	MLE of Standard Deviation			
e 1 e	nu star			
4 3 3	na otai	17 1.7		
4 1 K	A-D Test Statistic	0.573	Nonparametric Statistics	
e 1 e	5% A-D Critical Value		90% Percentile	01 27
	K-S Test Statistic		95% Percentile	
	5% K-S Critical Value		95% Percentile	
	4		99% Percentile	114
	Data appear Gamma Distributed at 5% Significan	ice Levei		
			95% UTL with 90% Coverage	~=
	Assuming Gamma Distribution		95% IIII with 90% Coverage	8/
		0.4.00		
	90% Percentile		95% Percentile Bootstrap UTL with 90% Coverage	90.8
	90% Percentile 95% Percentile	112.4	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage	90.8 90.8
* * *	90% Percentile	112.4	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL	90.8 90.8 104.1
e e e	90% Percentile 95% Percentile 99% Percentile	112.4 150.8	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	90.8 90.8 104.1 166.9
* * * *	90% Percentile 95% Percentile 99% Percentile 95% WH Approx. Gamma UPL	112.4 150.8	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL	90.8 90.8 104.1 166.9
* 1 * * * * * * * * * * * * * * * * * *	90% Percentile 95% Percentile 99% Percentile 99% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL	112.4 150.8 114 119.4	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	90.8 90.8 104.1 166.9
* * * *	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	112.4 150.8 114 119.4 116.5	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	90.8 90.8 104.1 166.9
* * * *	90% Percentile 95% Percentile 99% Percentile 99% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL	112.4 150.8 114 119.4 116.5	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	90.8 90.8 104.1 166.9
* * * * * * * * * * * * * * * * * * *	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	112.4 150.8 114 119.4 116.5	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	90.8 90.8 104.1 166.9
	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	112.4 150.8 114 119.4 116.5	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	90.8 90.8 104.1 166.9
	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	112.4 150.8 114 119.4 116.5	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	90.8 90.8 104.1 166.9
* * * * * * * * * * * * * * * * * * *	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	112.4 150.8 114 119.4 116.5	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	90.8 90.8 104.1 166.9
	90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	112.4 150.8 114 119.4 116.5	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL	90.8 90.8 104.1 166.9
	90% Percentile 95% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage	112.4 150.8 114 119.4 116.5 122.3	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	90.8 90.8 104.1 166.9
	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage M MG/KG ZINC  (so_sb)	112.4 150.8 114 119.4 116.5 122.3	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	90.8 90.8 104.1 166.9 109.3
	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage M MG/KG ZINC  (so_sb)  Total Number of Observations	112.4 150.8 114 119.4 116.5 122.3 <b>General</b>	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	90.8 90.8 104.1 166.9 109.3
	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage M MG/KG ZINC  (so_sb)	112.4 150.8 114 119.4 116.5 122.3 <b>General</b>	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR	90.8 90.8 104.1 166.9 109.3
	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor	112.4 150.8 114 119.4 116.5 122.3 <b>General</b>	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics Number of Distinct Observations	90.8 90.8 104.1 166.9 109.3
e e e	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics	112.4 150.8 114 119.4 116.5 122.3 <b>General</b> 100 1.524	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics	90.8 90.8 104.1 166.9 109.3
e e e	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics Minimum	112.4 150.8 114 119.4 116.5 122.3 <b>General</b> 100 1.524	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum	90.8 90.8 104.1 166.9 109.3 93
e e e	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% HW Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum	112.4 150.8 114 119.4 116.5 122.3 <b>General</b> 100 1.524	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum	90.8 90.8 104.1 166.9 109.3 93
e e e	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest	112.4 150.8 114 119.4 116.5 122.3 General 100 1.524	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest	90.8 90.8 104.1 166.9 109.3 93 2.929 4.311 4.278
e e e	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile	112.4 150.8 114 119.4 116.5 122.3 General 100 1.524 18.7 74.5 72.1 30.83	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile	90.8 90.8 104.1 166.9 109.3 93 2.929 4.311 4.278 3.428
e s x	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% HW Approx. Gamma UPL 95% HW Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median	112.4 150.8 114 119.4 116.5 122.3 General 100 1.524 18.7 74.5 72.1 30.83 38.75	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics  Number of Distinct Observations  Log-Transformed Statistics  Minimum Maximum Second Largest First Quartile Median	90.8 90.8 104.1 166.9 109.3 93 2.929 4.311 4.278 3.428 3.657
e e e	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	112.4 150.8 114 119.4 116.5 122.3 General 100 1.524 18.7 74.5 72.1 30.83 38.75 51.2	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR Upper Threshold Upper T	90.8 90.8 104.1 166.9 109.3 93 2.929 4.311 4.278 3.428 3.657 3.936
e e e	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	112.4 150.8 114 119.4 116.5 122.3 General 100 1.524 18.7 74.5 72.1 30.83 38.75	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics    Log-Transformed Statistics   Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	90.8 90.8 104.1 166.9 109.3 93 2.929 4.311 4.278 3.428 3.657 3.936 3.671
e s x	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	112.4 150.8 114 119.4 116.5 122.3 General 100 1.524 18.7 74.5 72.1 30.83 38.75 51.2	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics    Log-Transformed Statistics   Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	90.8 90.8 104.1 166.9 109.3 93 2.929 4.311 4.278 3.428 3.657 3.936
e e e	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile	112.4 150.8 114 119.4 116.5 122.3 General 100 1.524 18.7 74.5 72.1 30.83 38.75 51.2 41.23 13.04	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics    Log-Transformed Statistics   Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	90.8 90.8 104.1 166.9 109.3 93 2.929 4.311 4.278 3.428 3.657 3.936 3.671
	90% Percentile 95% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 99% Percentile 95% WH Approx. Gamma UPL 95% WH Approx. Gamma UTL 95% WH Approx. Gamma UTL with 90% Coverage 95% HW Approx. Gamma UTL with 90% Coverage  M MG/KG ZINC  (so_sb)  Total Number of Observations Tolerance Factor  Raw Statistics  Minimum Maximum Second Largest First Quartile Median Third Quartile Mean SD	112.4 150.8 114 119.4 116.5 122.3 General 100 1.524 18.7 74.5 72.1 30.83 38.75 51.2 41.23 13.04 0.316	95% Percentile Bootstrap UTL with 90% Coverage 95% BCA Bootstrap UTL with 90% Coverage 95% UPL 95% Chebyshev UPL Upper Threshold Limit Based upon IQR  Statistics    Log-Transformed Statistics   Minimum Maximum Second Largest First Quartile Median Third Quartile Mean	90.8 90.8 104.1 166.9 109.3 93 2.929 4.311 4.278 3.428 3.657 3.936 3.671

, , , , , , , , , , , , , , , , , , ,	D I	h	q			1 8	r
	· 	Backgrou	nd Statistics				
Normal Distribu				Log	normal Distrib	ution Test	
Lillie	fors Test Statistic	0.108			Lillief	ors Test Statistic	0.079
Lillie	fors Critical Value	0.0886			Lilliefo	ors Critical Value	0.088
Data not Normal at 5% \$	Significance Leve	ı	Data	appear L	ognormal at 5°	% Significance L	evel
Assuming Normal				Assum	ning Lognorma		
95% UTL with	n 90% Coverage	61.1			95% UTL with	90% Coverage	
	95% UPL (t)	62.99				95% UPL (t)	66
g	00% Percentile (z)	57.94			90	0% Percentile (z)	58.52
g	5% Percentile (z)	62.68			98	5% Percentile (z)	65.52
g	99% Percentile (z)	71.56			99	9% Percentile (z)	80.9
Gamma Distribu	ution Test			[	Data Distribution	on Test	
	k star	10.26	Data	appear L	ognormal at 5°	% Significance L	evel
	Theta Star	4.019					
	MLE of Mean	41.23					
MLE of S	tandard Deviation	12.87					
	nu star						
	A-D Test Statistic	1.033		No	onparametric S	Statistics	•
5% .	A-D Critical Value	0.752			-	90% Percentile	60.95
	K-S Test Statistic	0.0919				95% Percentile	63.22
5%	K-S Critical Value	0.0894				99% Percentile	72.12
Data not Gamma Distributed a	nt 5% Significance	Level					
Assuming Gamma						90% Coverage	
	90% Percentile		95% Perce	entile Boot	strap UTL with	90% Coverage	61.76
	95% Percentile	64.43	95%	BCA Boot	strap UTL with	90% Coverage	62.39
	99% Percentile	76.91				95% UPL	
						Chebyshev UPL	
	rox. Gamma UPL			Upper T	hreshold Limit	Based upon IQR	81.76
	rox. Gamma UPL						
95% WH Approx. Gamma UTL with							
95% HW Approx. Gamma UTL with	n 90% Coverage	62.34					
M MG/KG ZINC  (so_ss)							
		Genera	Statistics				
Total Number	er of Observations			N	lumber of Disti	nct Observations	103
	Tolerance Factor	1.506					
Raw Statis	stics			Log	g-Transformed	Statistics	
	Minimum					Minimum	2.35
	Maximum					Maximum	
	Second Largest					Second Largest	
	First Quartile					First Quartile	
	Median	30.4				Median	3.414
	Third Quartile	40.25				Third Quartile	3.695
	Mean	1				Mean	
		16.34					0.44
Coeff	ficient of Variation	0.482					
	Skewness						
		Backgrou	nd Statistics		1=1		
Normal Distribu		0.110		Log	normal Distrib		0.0-
	fors Test Statistic					ors Test Statistic	
Data not Normal at 5% S	fors Critical Value Significance Leve	1	Data	appear L		ors Critical Value  % Significance L	
Assuming Normal	Dietribution		1	Δοοι	ning Lognorma	I Dietribution	
Assuming Normal	DISTIDUTION			ASSUII	iing Lognornia	ii Distribution	

	Y F C D 1	,		r
	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	95% UPL (t)	61.12	95% UPL (t)	64.44
1 1 1 *	90% Percentile (z)	54.84	90% Percentile (z)	54.28
1 1 1 1	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)		99% Percentile (z)	
1 1 1 1	99% Percentile (2)	71.91	99% Percentile (2)	00.00
1 1 1 1	Gamma Distribution Test		Data Distribution Test	
1 1 1 1	k star	4.928	Data Follow Appr. Gamma Distribution at 5% Signification	ance Le
1 1 1 1	Theta Star	6.879		
1 1 1 1	MLE of Mean			
1 1 1 1	MLE of Standard Deviation			
1	nu star	1133		
	A-D Test Statistic	1.243	Nonparametric Statistics	
1 * 1	5% A-D Critical Value	0.755	90% Percentile	55.8
1 + 1	K-S Test Statistic		95% Percentile	65 72
1 # 1	5% K-S Critical Value		99% Percentile	
1 * *				04.02
	Pata follow Appx. Gamma Distribution at 5% Signific	cance Leve		
1 * *				
3 # #	Assuming Gamma Distribution		95% UTL with 90% Coverage	
1 # 1	90% Percentile	54.35	95% Percentile Bootstrap UTL with 90% Coverage	
1 * *	95% Percentile		95% BCA Bootstrap UTL with 90% Coverage	
1 * *				
	99% Percentile	79.08	95% UPL	
			95% Chebyshev UPL	
	95% WH Approx. Gamma UPL		Upper Threshold Limit Based upon IQR	69.05
* * 1	95% HW Approx. Gamma UPL	62.78		
	95% WH Approx. Gamma UTL with 90% Coverage			
	95% HW Approx. Gamma UTL with 90% Coverage			
	OS UG/KG 1,1-BIPHENYL  (br_na)			
		General	Statistics	
	Total Number of Observations		Number of Distinct Observations	٥
x 1 1	Tolerance Factor	N/A	Number of Missing Values	30
	Warning: Thi	s data set	only has 0 observations!	
			and meaningful statistics and estimates!	
F 1 1			-BIPHENYL  (br_na) was not processed!	
	The data set for variable OSI	ou/Kuji,i	-BIPHENTE (DI_Ha) was not processed:	
			rvations before using these statistical methods!	
	If possible, compute and collect Data Qua	ility Object	ives (DQO) based sample size and analytical results	
F 1 1				
	OS UG/KG 1,1-BIPHENYL  (so_sb)			
		O	Charlesian	
		1	Statistics	
	Total Number of Observations	+	Number of Distinct Observations	
	Tolerance Factor	N/A	Number of Missing Values	100
	\//app:==. Th:	o doto oct	anly has 0 absorvational	
			only has 0 observations!	
X 1 1	<u> </u>		and meaningful statistics and estimates! -BIPHENYL  (so_sb) was not processed!	
	The data set for variable Os		The state of the s	
	It is suggested to collect at least 8 t	o 10 obse	rvations before using these statistical methods!	
			ives (DQO) based sample size and analytical results	
F 1 1		- · ·	· · · · · · · · · · · · · · · · · · ·	
* * *				
x 1 +				
	OOULOWOIL A DIDUENNEL ( )			
	OS UG/KG 1,1-BIPHENYL  (so_ss)			

	у у с		h.	e		1	1	E	r
		07.515	1	Statistics					10
		of Valid Data					ber of Det		
	Number of Distinct De	etected Data	U			Numbe	er of Non-D	etect Data	40
	Warning: All observations are I	Von-Detects	(NDs) the	refore all s	tatistics a	nd estimat	es should	also he NI	)sl
1 1 1 3	Specifically, sample mean, UCLs								
	The Project Team may decide to use al								
			- оросии				parame	( <b>g</b> -, -	
	The data set for v	ariable OS	JG/KG 1,1	-BIPHENY	L  (so_ss)	was not p	rocessed!		
	OS UG/KG 2,2'-OXYBIS(1-CHLOROPI	ROPANE)  (I	or_na)						
			General	Statistics					
1 1 1 1	Total Number of C	)hservations		Otatiotics	N	Jumber of	Distinct Ob	servations	0
		rance Factor					ber of Miss		
							20. 000	g valace	100
		Varning: Thi							
1 1 1 1	Data set is too sn								
	The data set for variable OS	UG/KG 2,2'	-OXYBIS(	1-CHLORC	PROPAN	E)  (br_na	) was not p	rocessed!	
	14 to		- 40 -1		<b>6</b>	41		L - J - I	
	It is suggested to collect								_
1 1 1 1	If possible, compute and colle	ct Data Qua	lity Object	ives (DQO)	) based sa	mpie size	and analy	icai resuit	5.
1 1 1 0	OS UG/KG 2,2'-OXYBIS(1-CHLOROPI	ROPANE)I (	so sb)						
1 1 1 1			General	Statistics					
1 1 1 1	Total Number of C	Observations	0		١	Number of	Distinct Ob	servations	0
1 4 3 4	Tole	rance Factor	N/A			Num	ber of Miss	ing Values	100
1 1 1	1	Namina, Thi	- 4-44	anhi haa O					
1 1 1 1	Data set is too sm	Varning: This					actimatacl		
1 1 1 1	The data set for variable OS							rocessed	
	1110 data 001101 tanabi0 00	O G/	O)(1.5.0(	. 0200			, 1140 1101	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	!
	It is suggested to collect	t at least 8 t	o 10 obsei	vations be	fore using	these stat	istical met	hods!	
1 1 1 1	If possible, compute and colle								3.
		DODANIEN (							
	OS UG/KG 2,2'-OXYBIS(1-CHLOROPI	ROPANE)  (	so_ss)						
			General	Statistics					
	Number	of Valid Data		Otationos		Nun	nber of Det	ected Data	0
	Number of Distinct De						er of Non-D		
			1-						1.4
1 1 1 1	Warning: All observations are I	Non-Detects	(NDs), the	erefore all s	statistics a	nd estimat	es should	also be NI	Os!
1 * * 1	Specifically, sample mean, UCLs	, UPLs, and	other stati	stics are al	lso NDs lyi	ng below	the largest	detection	limit!
	The Project Team may decide to use al	ternative site	e specific v	/alues to es	stimate en	vironment	al paramet	ers (e.g., E	EPC, BTV)
	The data set for variable OS	UG/KG 2,2'	-OXYBIS(	1-CHLORC	PROPAN	E)  (so_ss	) was not p	processed!	
	OSILIC/KGIS & E TRICUI OROBUENO	II/br po\							
	OS UG/KG 2,4,5-TRICHLOROPHENO	LI (DI_Na)							
1 + + 1			General	Statistics					
	Total Number of C	)hservations	1	Ciausucs	N	Jumber of	Distinct Ob	servations	0
1 + + 1		rance Factor			<u>I</u>		ber of Miss		
	I Ole	ance i acidi	13//7	1		inuill	OI WII35	my values	100

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• • •	•										
* 1						only has 0					
						and mean					
• •	The o	lata set for	variable (	os ug/kg	2,4,5-TRI	CHLOROP	HENOL  (	br_na) wa	s not proce	ssed!	
									istical meth		
	If possible,	compute	and collect	Data Qua	lity Object	ives (DQO	) based sa	imple size	and analyt	ical results	3.
	OS UG/KG 2,4,5-TF	ICHLORC	PHENOLI	(so sh)							
1 1	00 00/110 2,4,0-11		/ IILIYOL	(30_35)							
					General	Statistics					
		Total Nur	mber of Ob	servations				Number of	Distinct Ob	servations	0
, .			Tolera	nce Factor	N/A			Num	ber of Miss	ing Values	100
, ,											
1 1											
1 1						only has 0					
, ,						and mean					
, ,	The o	lata set for	variable (	osjug/kg	2,4,5-TRI	CHLOROP	HENOL  (	so_sb) wa	s not proce	essed!	
, ,											
									istical meth		
	If possible,	compute	and collect	Data Qua	lity Object	ives (DQO	) based sa	imple size	and analyt	ical results	3.
1.1	OS UG/KG 2,4,5-TF	ICHI OBC	PHENOLI	(en ee)							
- 1 1	00 00/110 2,4,0-11	NOTILOTIC	/ IILINOL	(30_33)							
					Conoral	Statistics					
			Number of	Valid Data		OtationCo		Num	nber of Dete	ected Data	0
	N			Valid Data	40	Otatiotics			nber of Dete		
1 1	N			Valid Data ected Data	40	Otatistics			nber of Dete er of Non-D		
1 1	N Warning: All	umber of D	istinct Dete	ected Data	0		statistics a	Numbe	er of Non-D	etect Data	40
2 4 2 4 2 2 4	Warning: All Specifically, s	umber of D observation	ons are No	ected Data on-Detects UPLs, and	40 0 (NDs), the	erefore all s	so NDs ly	Number nd estimating below t	er of Non-D es should a the largest	etect Data also be NE detection	40 Os! Iimit!
3 3 4 3 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Warning: All	umber of D observation	ons are No	ected Data on-Detects UPLs, and	40 0 (NDs), the	erefore all s	so NDs ly	Number nd estimating below t	er of Non-D es should a the largest	etect Data also be NE detection	40 Os! Iimit!
	Warning: All Specifically, sa The Project Team m	umber of D observation ample mea ay decide	ons are No on, UCLs, I to use alte	ected Data on-Detects UPLs, and ornative site	40 0 (NDs), the other stati	erefore all s stics are a values to es	so NDs ly stimate en	Numbernd estimating below to vironmenta	er of Non-D es should a the largest al paramete	etect Data also be NE detection ers (e.g., E	40 Os! Iimit!
1 1 1	Warning: All Specifically, sa The Project Team m	umber of D observation ample mea ay decide	ons are No on, UCLs, I to use alte	ected Data on-Detects UPLs, and ornative site	40 0 (NDs), the other stati	erefore all s stics are a values to es	so NDs ly stimate en	Numbernd estimating below to vironmenta	er of Non-D es should a the largest	etect Data also be NE detection ers (e.g., E	40 Os! Iimit!
	Warning: All Specifically, sa The Project Team m	umber of D observation ample mea ay decide	ons are No on, UCLs, I to use alte	ected Data on-Detects UPLs, and ornative site	40 0 (NDs), the other stati	erefore all s stics are a values to es	so NDs ly stimate en	Numbernd estimating below to vironmenta	er of Non-D es should a the largest al paramete	etect Data also be NE detection ers (e.g., E	40 Os! Iimit!
	Warning: All Specifically, sa The Project Team m	umber of D observation ample mea ay decide	ons are No on, UCLs, I to use alte	ected Data on-Detects UPLs, and ornative site	40 0 (NDs), the other stati	erefore all s stics are a values to es	so NDs ly stimate en	Numbernd estimating below to vironmenta	er of Non-D es should a the largest al paramete	etect Data also be NE detection ers (e.g., E	40 Os! Iimit!
11.	Warning: All Specifically, so The Project Team m The c	observation observation observation observation observation observation observation observation observation observation observation	ons are No ons are No on, UCLs, I to use alte	on-Detects UPLs, and ornative site	40 0 (NDs), the other stati	erefore all s stics are a values to es	so NDs ly stimate en	Numbernd estimating below to vironmenta	er of Non-D es should a the largest al paramete	etect Data also be NE detection ers (e.g., E	40 Os! Iimit!
	Warning: All Specifically, sa The Project Team m	observation observation observation observation observation observation observation observation observation observation observation	ons are No ons are No on, UCLs, I to use alte	on-Detects UPLs, and ornative site	40 0 (NDs), the other stati	erefore all s stics are a values to es	so NDs ly stimate en	Numbernd estimating below to vironmenta	er of Non-D es should a the largest al paramete	etect Data also be NE detection ers (e.g., E	40 Os! Iimit!
	Warning: All Specifically, so The Project Team m The c	observation observation observation observation observation observation observation observation observation observation observation	ons are No ons are No on, UCLs, I to use alte	on-Detects UPLs, and ornative site	(NDs), the other static specific v	erefore all s stics are al values to es	so NDs ly stimate en	Numbernd estimating below to vironmenta	er of Non-D es should a the largest al paramete	etect Data also be NE detection ers (e.g., E	40 Os! Iimit!
	Warning: All Specifically, so The Project Team m The c	observation observation observation ample mea ay decide lata set for	ons are No ons, UCLs, I to use alte variable (	on-Detects UPLs, and rmative site DS UG/KG	(NDs), the other stati e specific v	erefore all s stics are a values to es	so NDs ly stimate en HENOL  (	Number nd estimat ing below to vironmenta so_ss) was	er of Non-D es should a the largest al paramete	etect Data also be NE detection ers (e.g., E essed!	9s! limit! EPC, BTV
	Warning: All Specifically, so The Project Team m The c	observation observation observation ample mea ay decide lata set for	ons are No on, UCLs, I to use alte variable ( OPHENOL)	on-Detects UPLs, and ornative site	(NDs), the other stati e specific v	erefore all s stics are al values to es	so NDs ly stimate en HENOL  (	Number of	er of Non-D les should a the largest al paramete s not proce	etect Data also be NE detection ers (e.g., E essed!	9s! limit! EPC, BTV
	Warning: All Specifically, so The Project Team m The c	observation observation observation ample mea ay decide lata set for	ons are No on, UCLs, I to use alte variable ( OPHENOL)	on-Detects UPLs, and rmative site DS UG/KG (br_na)	(NDs), the other stati e specific v	erefore all s stics are al values to es	so NDs ly stimate en HENOL  (	Number of	er of Non-D tes should a the largest al paramete s not proce	etect Data also be NE detection ers (e.g., E essed!	9s! limit! EPC, BTV
	Warning: All Specifically, so The Project Team m The c	observation observation observation ample mea ay decide lata set for	ons are No on, UCLs, I to use alte variable ( OPHENOL)	on-Detects UPLs, and rmative site DS UG/KG (br_na)	(NDs), the other stati e specific v	erefore all s stics are al values to es	so NDs ly stimate en HENOL  (	Number of	er of Non-D tes should a the largest al paramete s not proce	etect Data also be NE detection ers (e.g., E essed!	9s! limit! EPC, BTV
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2 8	OS UG/KG 2,4,6-TRICHLOROPHENOL  (so_ss)	
		Statistics
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	Number of Distinct Detected Data 0	Number of Non-Detect Data 40
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		refore all statistics and estimates should also be NDs! stics are also NDs lying below the largest detection limit!
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1 1	The Project Team may decide to use alternative site specific v	alues to estimate environmental parameters (e.g., Er C, D1 v
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. 1	OS UG/KG 2,4-DICHLOROPHENOL  (br_na)	
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	General	Statistics
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		vations before using these statistical methods!
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	1 (1 = 1)	
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	Tolerance Factor	N/A			Num	ber of Miss	sing Values	100
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	OS UG/KG 2-CHLORONAPHTHALENE  (so_ss)							
	G	General	Statistics					
* 1 * 1	Number of Valid Data 40	)			Num	ber of Det	ected Data	0
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	The Project Team may decide to use alternative site sp	pecific v	alues to es	stimate en	vironment	al parame	ers (e.g., l	EPC, BTV)
	The data set for variable OS UG/KG 2-0	CHLOR	ONAPHTH	IALENE  (	so_ss) wa	s not proc	essed!	
	OS UG/KG 2-CHLOROPHENOL  (br_na)							
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	ii possible, compute and conect bata duality	Jujecu	1.30 (1.040)	, Justu sa	pio size	and analy	aoui roouit	·.
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Warning: This data set only has 0 observations!  Data set is too small to compute reliable and meaningful statistics and estimates!  The data set for variable OS UG/KG 2-CHLOROPHENOL  (so_sb) was not processed!  It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  OS UG/KG 2-CHLOROPHENOL  (so_se)  General Statistics  Number of Valid Data 40  Number of Detected Data 0  Number of Detected Data 0  Number of Number of Detected Data 0  Number of Detected Data 0  Number of Number of Detected Data 0  Number of Distinct Observations 0  Number of Distinct Observations 0  Number of Detected Data 0  Num		Y		c	В			e			,	*	r
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It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  OS UG/KG 2-CHLOROPHENOL  (so_es)  General Statistics  Number of Distinct Detected Data   40  Number of Distinct Detected Data   40  Number of Distinct Detected Data   40  Number of Distinct Detected Data   40  Number of Non-Detect Data   40  Warning: All observations are Non-Detects (MDs), therefore all statistics and estimates should also be NDa!  Specifically, ample mean, UCLs, UPLs, and other statistics are also NDs tying below the largest detection limit!  The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).  The data set for variable OS UG/KG 2-CHLOROPHENOL  (so_ss) was not processed!  OS UG/KG 2-METHYLNAPHTHALENE[ (br_na)  General Statistics  Total Number of Observations   0  Number of Missing Values   30  Warning: This data set only has 0 observations!  It is suggested to collect at least 8 to 10 observations before using these statistical methods!  It is suggested to collect at least 8 to 10 observations before using these statistical methods!  Total Number of Observations   0  Total Number of Observations   0  Tolerance Factor   NA   Number of Distinct Observations   0  Tolerance Factor   NA   Number of Distinct Observations   0  Tolerance Factor   NA   Number of Distinct Observations   0  Tolerance Factor   NA   Number of Distinct Observations   0  Tolerance Factor   NA   Number of Distinct Observations   0  Tolerance Factor   NA   Number of Distinct Observations   0  Tolerance Factor   NA   Number of Distinct Observations   0  Tolerance Factor   NA   Number of Distinct Observations   0  Number of Valid Data   40  Number of Valid Data   40  Number of Non-Detect Data   40  Number of Non-Detect Data   40  Number of Non-Detect Data   40  Number of Non-Detect Data   40  Number of Non-Detect Data   40  Number of Non-Detect Data   40  Num	1 1 1 1		Т										
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OS UG/KG 2-METHYLNAPHTHALENE  (br_na)  General Statistics  Total Number of Observations   0		i ne Projec	ct ieam m	ay decide	to use alte	rnative site	e specific \	alues to e	stimate en	vironmen	tai parame	eters (e.g., i	PC, BTV).
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Total Number of Observations   0 Number of Distinct Observations   0 Number of Missing Values   30    Warning: This data set only has 0 observations!  Data set is too small to compute reliable and meaningful statistics and estimates!  The data set for variable OS UG/KG 2-METHYLNAPHTHALENE  (br_na) was not processed!  It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  OS UG/KG 2-METHYLNAPHTHALENE  (so_sb)  General Statistics  Total Number of Observations   0 Number of Distinct Observations   0 Number of Missing Values   100    Warning: This data set only has 0 observations!  Data set is too small to compute reliable and meaningful statistics and estimates!  The data set for variable OS UG/KG 2-METHYLNAPHTHALENE  (so_sb) was not processed!  It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  OS UG/KG 2-METHYLNAPHTHALENE  (so_ss)  General Statistics  Number of Valid Data  40 Number of Detected Data  0 Number of Non-Detect Data  40 Number of Non-Detect Data  40													
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If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  OS UG/KG 2-METHYLNAPHTHALENE  (so_sb)  General Statistics  Total Number of Observations   0	* 1 1 *					<u> </u>				·			
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Data set is too small to compute reliable and meaningful statistics and estimates!  The data set for variable OS UG/KG 2-METHYLNAPHTHALENE  (so_sb) was not processed!  It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  OS UG/KG 2-METHYLNAPHTHALENE  (so_ss)  General Statistics  Number of Valid Data   40	1 1 1 1												
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The data set for variable OS UG/KG 2-METHYLNAPHTHALENE  (so_sb) was not processed!  It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  OS UG/KG 2-METHYLNAPHTHALENE  (so_ss)  General Statistics  Number of Valid Data   40   Number of Detected Data   0   Number of Distinct Detected Data   0   Number of Non-Detect Data   40   Number of Non-Detect   40   Number of Non-Detect Data   40   Number of Non-Detect   40   Number of Non-Detect Data   40   Number of Non-Detect   40				Data set							estimates	!	
It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  OS UG/KG 2-METHYLNAPHTHALENE  (so_ss)  General Statistics  Number of Valid Data   40   Number of Detected Data   0   Number of Distinct Detected Data   0   Number of Non-Detect Data   40   Num	1 1 1 4		The										
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  OS UG/KG 2-METHYLNAPHTHALENE  (so_ss)  General Statistics  Number of Valid Data   40   Number of Detected Data   0   Number of Distinct Detected Data   0   Number of Non-Detect Data   40   Nu	1 1 1 0			550101		,, 10				, ***	p. oc		
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.  OS UG/KG 2-METHYLNAPHTHALENE  (so_ss)  General Statistics  Number of Valid Data   40   Number of Detected Data   0   Number of Distinct Detected Data   0   Number of Non-Detect Data   40   Nu	1 1 1 1		lt is s	suggested	to collect :	at least 8 t	o 10 obsei	vations he	fore using	these sta	tistical me	thods	
OS UG/KG 2-METHYLNAPHTHALENE  (so_ss)  General Statistics  Number of Valid Data   40	1 1 1 1	I.											
General Statistics  Number of Valid Data 40 Number of Detected Data 0  Number of Distinct Detected Data 0  Number of Non-Detect Data 40	* 1 * 1	•	. Possibie,	compute o	and Concol	Juliu Wua	y Object	טאטן טטרט	, sascu sa	pic size	, and analy	, acui 163ulu	<i>,</i> .
General Statistics  Number of Valid Data 40 Number of Detected Data 0  Number of Distinct Detected Data 0  Number of Non-Detect Data 40													
General Statistics  Number of Valid Data 40 Number of Detected Data 0  Number of Distinct Detected Data 0  Number of Non-Detect Data 40	1 1 1 1												
General Statistics  Number of Valid Data 40 Number of Detected Data 0  Number of Distinct Detected Data 0  Number of Non-Detect Data 40		OSILIC/IV	212 METLE	VINADUT	UAL ENEL	(60.00)							
Number of Valid Data   40	1 1 1 1	Josipa/K	aj∠-IVI⊏ I H	ILNAPHI	HALENE	(30_55)							
Number of Valid Data   40							0'	Ctatlatia					
Number of Distinct Detected Data 0 Number of Non-Detect Data 40	1 1 1 4				Viumba:: - C	/\alia D-+		Statistics		K1.	mhar of D	tooted D-4	0
			k +										
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			N	urnber of D	istinct Dete	ected Data	U			Numb	er of Non-	petect pata	40
vvarning: All observations are non-Detects (NDs), therefore all statistics and estimates should also be NDs!		,,,			A!	- D	(AIDs) #	fau!!		ساهما است		lalaa bir bu	\
		Į W	arning: All	observatio	ons are No	n-petects	(אטא), the	retore all s	statistics a	na estima	iles snould	aiso de Ni	JS!

		stics are also NDs lying below the largest detection limit!
	The Project Team may decide to use alternative site specific v	alues to estimate environmental parameters (e.g., EPC, BTV).
	TI I I O U O U O WOLO METUD	(ALABITHAL FAIR)
	The data set for variable OS UG/KG 2-METHY	LNAPHTHALENE  (so_ss) was not processed!
1 1 1 4		
	OS UG/KG 2-METHYLPHENOL  (br_na)	
	1 1 1 1	
	General	Statistics
	Total Number of Observations 0	Number of Distinct Observations 0
	Tolerance Factor N/A	Number of Missing Values 30
* 7 * 1	Warning: This data set	only has 0 observations!
	<u> </u>	and meaningful statistics and estimates!
		FHYLPHENOL  (br_na) was not processed!
1 7 3 0		
* * 3 *		vations before using these statistical methods!
* * 3 *	If possible, compute and collect Data Quality Objecti	ves (DQO) based sample size and analytical results.
* * * *		
* 1 2 *	OS UG/KG 2-METHYLPHENOL  (so_sb)	
* 1 1 1		
* * 3 *	General	Statistics
* * 1 *	Total Number of Observations 0	Number of Distinct Observations 0
	Tolerance Factor N/A	Number of Missing Values 100
	W	
		only has 0 observations! and meaningful statistics and estimates!
		FHYLPHENOL  (so_sb) was not processed!
	The data set for variable Oolog/RG[2-ML	TITLE TIENCE (30_3b) was not processed:
	It is suggested to collect at least 8 to 10 obser	vations before using these statistical methods!
		ves (DQO) based sample size and analytical results.
	COULD //COO METLIN/I BUENOU /)	
	OS UG/KG 2-METHYLPHENOL  (so_ss)	
	General	Statistics
	Number of Valid Data 40	Number of Detected Data 0
	Number of Distinct Detected Data 0	Number of Non-Detect Data 40
* 1 * 1		
		refore all statistics and estimates should also be NDs!
		stics are also NDs lying below the largest detection limit!
	The Project Team may decide to use alternative site specific v	alues to estimate environmental parameters (e.g., EPC, BTV).
	The date set for verichis OSHIC/VCIO MET	FHYLPHENOL  (so_ss) was not processed!
	The data set for variable OS OG/NG 2-ME	TITLETTIENOL  (50_55) Was not processed!
	OS UG/KG 2-NITROANILINE  (br_na)	
1 1 1 3		
	*	Statistics
	Total Number of Observations 0	Number of Distinct Observations 0
	Tolerance Factor N/A	Number of Missing Values 30
1 1 1 2		
1 1 1 1	Werning: This data and	only has 0 observations!
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		TROANILINE  (br_na) was not processed!
		1, = , , , =

* * * 1		h.	o		'	,	
	It is suggested to collect at least 8 to	o 10 obser	vations be	fore using th	ese stati	stical methods!	
	If possible, compute and collect Data Qual	lity Objecti	ves (DQO)	based sam	ple size a	and analytical results	3.
1 1 1 1	COULD (KOIO NUTRO ANUI INEL ( I )						
	OS UG/KG 2-NITROANILINE  (so_sb)						
		Conorol	Statistics				
1 1 1 1	Total Number of Observations		Statistics	Nu	mber of [	Distinct Observations	0
	Tolerance Factor	N/A		Nu		per of Missing Values	
1 1 1 1	Tolerance Factor	14// (			IVAIII	oci oi iviiooirig valaco	100
1 1 1 1							
1 1 1 0	Warning: This	data set	only has 0	observations	s!		
* * 1 *	Data set is too small to compu	ite reliable	and mean	ingful statisti	ics and e	stimates!	
	The data set for variable OS UC	3/KG 2-NI	FROANILI	VE  (so_sb)	was not p	processed!	
	It is suggested to collect at least 8 to						
	If possible, compute and collect Data Qual	lity Objecti	ves (DQO)	based sam	ple size a	and analytical results	3.
* * 1 1							
	OS UG/KG 2-NITROANILINE  (so_ss)						
		General	Statistics				
	Number of Valid Data	40			Num	ber of Detected Data	0
	Number of Distinct Detected Data	0			Numbe	r of Non-Detect Data	40
	Warning: All observations are Non-Detects						
	Specifically, sample mean, UCLs, UPLs, and						
	The Project Team may decide to use alternative site	specific v	alues to es	stimate envir	ronmenta	ıl parameters (e.g., E	PC, BTV).
	The data ant for variable OSU IC	NACIO MI	TDO ANIII II	VEL (00, 00)		araaaaadl	
	The data set for variable OS U0	a/NG Z-NI	IKOANILII	N⊏  (SO_SS)	was not p	processeu:	
	OS UG/KG 2-NITROPHENOL  (br_na)						
T T E 3	OS UG/KG 2-NITROPHENOL  (br_na)						
T T E T			Statistics				
	Total Number of Observations	0	Statistics	Nu		Distinct Observations	
			Statistics	Nu		Distinct Observations per of Missing Values	
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	Total Number of Observations Tolerance Factor	0 N/A			Numb		
	Total Number of Observations Tolerance Factor  Warning: This	0 N/A	only has 0	observations	Numb	per of Missing Values	
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu	0 N/A	only has 0	observations	Numb	per of Missing Values	
	Total Number of Observations Tolerance Factor  Warning: This	0 N/A	only has 0	observations	Numb	per of Missing Values	
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu	0 N/A s data set o tte reliable	only has 0 and mean FROPHEN	observations ingful statisti OL  (br_na)	Numb s! ics and e was not	per of Missing Values sstimates! processed!	
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG	0 N/A s data set of the reliable G/KG 2-N 7	only has 0 and mean FROPHEN vations be	observations ingful statisti OL  (br_na) fore using th	Numb	per of Missing Values estimates! processed! stical methods!	30
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	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG	0 N/A s data set of the reliable G/KG 2-N 7	only has 0 and mean FROPHEN vations be	observations ingful statisti OL  (br_na) fore using th	Numb	per of Missing Values estimates! processed! stical methods!	30
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	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG	0 N/A s data set of the reliable G/KG 2-N 7	only has 0 and mean FROPHEN vations be	observations ingful statisti OL  (br_na) fore using th	Numb	per of Missing Values estimates! processed! stical methods!	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual	N/A s data set of the reliable B/KG 2-NITO 10 obsertity Objecti	only has 0 and mean FROPHEN vations be ves (DQO)	observations ingful statisti OL  (br_na) fore using th	Numb	per of Missing Values estimates! processed! stical methods!	30
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	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG  It is suggested to collect at least 8 to lf possible, compute and collect Data Qual  OS UG/KG 2-NITROPHENOL  (so_sb)  Total Number of Observations Tolerance Factor	o N/A s data set of the reliable G/KG 2-N 7 o 10 obsertity Objection  General O N/A	only has 0 and mean FROPHEN vations be ves (DQO)	observations ingful statisti OL  (br_na) fore using th ) based sam	Numb	per of Missing Values estimates! processed! stical methods! and analytical results	30 3.
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG 2-NITROPHENOL  (so_sb)  Total Number of Observations	O N/A  s data set of the reliable of the relia	only has 0 and mean FROPHEN vations be ves (DQO) Statistics	observations ingful statisti OL  (br_na) fore using th ) based sam  Nu	Numb	estimates! processed! stical methods! and analytical results Distinct Observations per of Missing Values	30 3.
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	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG  It is suggested to collect at least 8 to lf possible, compute and collect Data Qual  OS UG/KG 2-NITROPHENOL  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute data set for variable OS UG	O N/A  s data set of the reliable G/KG 2-NI  General O N/A  s data set of the reliable G/KG 2-NI	only has 0 and mean FROPHEN vations be ves (DQO) Statistics only has 0 and mean FROPHEN	observations ingful statisti OL  (br_na) fore using th ) based sam  Nu  observations ingful statisti OL  (so_sb)	Numb	estimates! processed! stical methods! and analytical results Distinct Observations per of Missing Values estimates! processed!	30 3.
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	osjug/K	G 2-NITRO	PHENOL	(so_ss)								
							Statistics					
				Number of		-			Num	ber of Dete	ected Data	0
		N	umber of D	istinct Dete	ected Data	0			Numbe	er of Non-D	etect Data	40
							refore all s					
							stics are al					
	The Project	ct Team m	ay decide	to use alte	rnative site	e specific v	alues to es	stimate en	vironmenta	al paramete	ers (e.g., E	PC, BTV).
		•	The data s	et for varia	ble OS U0	3/KG 2-NI	<b>TROPHEN</b>	OL  (so_ss	s) was not	processed	!	
	OS UG/K	G 3,3'-DIC	HLOROBE	ENZIDINE	(br_na)							
						General	Statistics					
			Total Nur	mber of Ob	servations	0		N	Number of	Distinct Ob	servations	0
				Tolera	nce Factor	N/A			Numl	oer of Missi	ng Values	30
* * * *												
				Wa	arning: This	s data set	only has 0	observatio	ns!			
			Data set	is too sma	II to compu	ite reliable	and mean	ingful stati	stics and e	estimates!		
		The c					LOROBEN				ssed!	
						•				•		
		It is :	suggested	to collect a	at least 8 t	o 10 obser	vations be	fore using	these stati	istical meth	ods!	
	I						ves (DQO)					· ·
			•					<u> </u>	•			
	OS UG/K	G 3,3'-DIC	HLOROBE	NZIDINE	(so_sb)							
						General	Statistics					
			Total Nur	mber of Ob	servations	0		N	Number of I	Distinct Ob	servations	0
				Tolera	nce Factor	N/A			Numl	per of Missi	ng Values	100
				Wa	arning: This	s data set	only has 0	observatio	ns!			
			Data set	is too sma	II to compu	ıte reliable	and mean	ingful stati	stics and e	estimates!		
		The d	lata set for	variable C	S UG/KG	3,3'-DICH	LOROBEN	IZIDINE  (s	so_sb) was	s not proce	ssed!	
1 1 1 1		It is	suggested	to collect	at least 8 t	o 10 obser	vations be	fore using	these stati	istical meth	ods!	
		f possible,	compute a	and collect	Data Qua	lity Objecti	ves (DQO)	) based sa	mple size	and analyti	cal results	
* * * 1												
	OS UG/K	G 3,3'-DIC	HLOROBE	NZIDINE	(so_ss)		-			-	-	
						General	Statistics					
			- 1	Number of	Valid Data	40			Num	ber of Dete	ected Data	0
		N	umber of D	istinct Dete	ected Data	0			Numbe	r of Non-D	etect Data	40
	W	arning: All	observation	ons are No	n-Detects	(NDs), the	refore all s	statistics ar	nd estimat	es should a	also be ND	s!
1 1 1 1	Spe	cifically, sa	ample mea	ın, UCLs, l	JPLs, and	other stati	stics are al	lso NDs lyi	ng below t	he largest	detection I	imit!
							alues to es					
						-				-		
		The c	ata set for	variable C	S UG/KG	3,3'-DICH	LOROBEN	IZIDINE  (s	so_ss) was	not proce	ssed!	
		-				-						
	OSJUG/K	GJ3-NITRO	ANILINEI	(br_na)								

	Y	,	c	р			e			1	r	r
			<u> </u>							ı	<u> </u>	
						General	Statistics					
1 1 1			Total Nu	mber of Ob	oservations	0		N	lumber of	Distinct Ob	servations	0
				Tolera	ince Factor	r N/A			Num	ber of Miss	ing Values	30
	1			147		!- J-44						
			Doto cot				only has 0			octimotocl		
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			The data s	oction van	able colo	a/Kajo-Ni	THOAINE	IAEI (DI_IIA	, was not	processeu		
		It is	suggested	to collect	at least 8	to 10 obse	rvations be	fore using	these stat	tistical metl	nods!	
		lf possible,	compute	and collec	t Data Qua	ality Object	ives (DQO	) based sa	mple size	and analyt	ical results	3.
* * * 3												
	<b>-</b>											
	001110714	OIO NITTO		/b)								
	OS UG/K	G 3-NITRO	DANILINE	(SO_SD)								
						General	Statistics					
			Total Nu	mber of Or	servations		Otatiotics	N	Jumber of	Distinct Ob	servations	0
			Total Na		nce Factor					ber of Miss		-
				. 5.514		1	1				<u> </u>	1
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							and mean					
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		14.1-		4U4		1- 10 -b		fanalaa.	41			
1 1 1 1										tistical metl and analyt		
	1	ii possible,	compute	ariu collec	i Dala Que	ality Object	ives (DQO	) Daseu sa	ilipie size	anu anaiyi	icai results	<b>&gt;.</b>
* * > *												
1 1 3 1	OSIUG/K	GJ3-NITRO	DANILINE	(so ss)								
* * 1 1	•	•	•	` - /								
							Statistics					
					Valid Data					nber of Dete		
	 	N	umber of D	istinct Det	ected Data	0			Numb	er of Non-D	etect Data	40
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	inc riojo	ot rounnin	ay acciac	to uso alto	Jillative Sit	c specific	values to e	Sumato on	VIIOIIIIOII	ai paramet	513 (C.g., L	
			The data s	et for vari	able OSIU	G/KG 3-NI	TROANILI	NEI (so ss	) was not	processed	!	
* * * 1					•	•			·	•		
	osjug/K	G 4,6-DINI	TRO-2-M	ETHYLPH	ENOL  (br	_na)						
						C'	Ctotlet!					
			Total Nee	mbor of Ok	oservations		Statistics	, ,	lumber of	Distinct Ob	convetions	n
			i Oldi INUI		nce Factor			IN IN		ber of Miss		
				101614	1 00.00	(10/71	<u> </u>		inuill	SCI OI IVIISS	g values	100
	İ			W	arning: Th	is data set	only has 0	observatio	ns!			
							and mean					
		The data	a set for va	riable OS	UG/KG 4,	6-DINITRO	D-2-METHY	/LPHENOL	_  (br_na)	was not pr	ocessed!	<u> </u>
								_				
										tistical metl		
		ıt possible,	compute	and collec	t Data Qua	ality Object	ives (DQO	) based sa	mple size	and analyt	icai results	<del>}</del> .
	OSILIG/K	G 4,6-DINI	TRO-2-MF	THYI PHI	ENOLI (so	sb)						
* * * 1		., ., o Diri	2 - 1711			/						
						General	Statistics					
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		h 6			1	ĸ	,
	Total Number of Observations 0			lumber of [	Distinct Ob	servations	0
		N/A			er of Missi		_
	Tolerance Factor 1	W// C		TTUTTLE	CI OI WIIOOI	ng values	100
1 1 1 1							
	Warning: This da	to got only boo	0 obconyatio	nol			
	Data set is too small to compute n				otimotool		
	The data set for variable OS UG/KG 4,6-DII	NITRO-2-METI	HYLPHENOL	(SO_SD) \	vas not pro	ocessea!	
* * * 1							
	It is suggested to collect at least 8 to 10						
	If possible, compute and collect Data Quality (	Objectives (DQ	O) based sai	mple size a	and analyti	cal results	3.
1 4 3 3	OS UG/KG 4,6-DINITRO-2-METHYLPHENOL  (so_ss)	<u> </u>					
		eneral Statistic	s				
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	Number of Distinct Detected Data 0			Numbe	r of Non-D	etect Data	40
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	OS UG/KG 4-BROMOPHENYL PHENYL ETHER  (br_r	na)					
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	ii possible, compute and concet Data Quanty	ODJUCTIVOS (DA	O) Dasca sai	TIPIC SIZC C	ina analyti	cui rosuit	7.
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## Table 2 ProUCL Output

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	Number of Valid Data 40	Number of Detected Data 0
	Number of Distinct Detected Data 0	Number of Non-Detect Data 40
	Warning: All observations are Non-Detects (NDs), ther	
	Specifically, sample mean, UCLs, UPLs, and other statis	
	The Project Team may decide to use alternative site specific va	llues to estimate environmental parameters (e.g., EPC, BTV)
	The data set for variable OS UG/KG ACEN	APHTHENE  (so_ss) was not processed!
	OS UG/KG ACENAPHTHYLENE  (br_na)	
	General S	Statistics
	Total Number of Observations 0	Number of Distinct Observations 0
	Tolerance Factor N/A	Number of Missing Values 30
	Warning: This data set o	nly has 0 observations!
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	Tolerance Factor N/A	Number of Missing Values 100
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	Specifically, sample mean, UCLs, UPLs, and other statis	
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	The data set for variable OS UG/KG ACENA	PHTHYLENE  (so_ss) was not processed!
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	OS UG/KG ACETOPHENONE  (br_na)	
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<b></b>	General S	Statistics
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K 0 K 7	Total Number of Observations 0 Tolerance Factor N/A	
E 0 E 7		Number of Distinct Observations   0 Number of Missing Values   30

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If possible, compute and collect Data Quali		<del>-</del>
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If possible, compute and collect Data Quali	ity Objecti	ves (DQO) based sample size and analytical results.
G/KG ACETOPHENONE  (so_ss)		
	General	Statistics
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3/KGIANTHRACENEI (br. na)		
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G/KG ANTHRACENE  (so_sb)		
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Data appear Gamma Distributed at 5% Significance Level  95% KM UTL with 90% Coverage Assuming Gamma Distribution  95% KM Chebyshev UPL Gamma ROS Statistics with Extrapolated Data Median 90.46  90.46  90% Percentile (z Median 94.82  95% Percentile (z SD 25.01  99% Percentile (z k star 11.56  Theta star 7.823  Gamma ROS Limits with Extrapolated Data Nu star 925.1  95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Percentile of Chisquare (2k) 35.33  95% Hawkins Wixley (HW) Approx. Gamma UPL 95% Percentile 125.8  90% Percentile 138.2  99% Percentile 138.2  99% Percentile 163.5  Note: DL/2 is not a recommended method.  General Statistics  Total Number of Observations 0  Number of Distinct Observations	
Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean 90.46  Median 94.82  SD 25.01  Theta star 7.823  Mustar 925.1  95% Wilson Hilferty (WH) Approx. Gamma UPL 95% WH Approx. Gamma UPL 95% Percentile 125.8  90% Percentile 125.8  90% Percentile 138.2  90% Percentile 163.5  Note: DL/2 is not a recommended method.  95% KM UTL with 90% Coverage 95% KM UPL (the part of Distinct Observations)  95% KM UTL with 95% KM Chebyshev UPI 95% KM UPL (the part of Distinct Observations)	30.91
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Gamma ROS Statistics with Extrapolated Data  Mean 90.46  Median 94.82  Median 94.82  Median 94.82  Median 94.82  Median 94.82  Median 94.82  Median 95% Percentile (z  SD 25.01  Median 94.82  Median 95% Percentile (z	
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SD   25.01   99% Percentile (z k star   11.56   Theta star   7.823   Gamma ROS Limits with Extrapolated Da   Nu star   925.1   95% Wilson Hilferty (WH) Approx. Gamma UPL   95% Percentile of Chisquare (2k)   35.33   95% Hawkins Wixley (HW) Approx. Gamma UPL   95% WH Approx. Gamma UTL with   90% Coverage   90% Percentile   125.8   95% HW Approx. Gamma UTL with   90% Coverage   95% Percentile   138.2   99% Percentile   163.5   Note: DL/2 is not a recommended method.    OS UG/KG BENZO(A)ANTHRACENE  (br_na)   General Statistics   Number of Distinct Observations   0   Number of Distinct Observations	
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95% Percentile 138.2 99% Percentile 163.5  Note: DL/2 is not a recommended method.  OS UG/KG BENZO(A)ANTHRACENE  (br_na)  General Statistics  Total Number of Observations 0 Number of Distinct Observations	138.5
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It is suggested to collect at least 8 to 10 observations before using these statistical methods!	
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical result	
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	<b>).</b>
OS UG/KG BENZO(A)ANTHRACENE  (so_sb)	<b>3.</b>

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	95% Percentile 99% Percentile Note: DL/2 is not a recommended method.  OS UG/KG BENZO(A)PYRENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG  It is suggested to collect at least 8 to lf possible, compute and collect Data Qua  OS UG/KG BENZO(A)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor	General  N/A  General  N/A  data set  ate reliable  KG BENZ  o 10 obser  General  N/A	Statistics    Number of Distinct Observations     Number of Missing Values	30
	95% Percentile 99% Percentile Note: DL/2 is not a recommended method.  OS UG/KG BENZO(A)PYRENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG BENZO(A)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute compute to compute the comput	General  N/A  General  N/A  General  N/A  General  N/A  General  N/A	Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! ZO(A)PYRENE  (br_na) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!	30
	95% Percentile 99% Percentile Note: DL/2 is not a recommended method.  OS UG/KG BENZO(A)PYRENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG BENZO(A)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute compute to compute the comput	General  N/A  General  N/A  General  N/A  General  N/A  General  N/A	Statistics    Number of Distinct Observations     Number of Missing Values	30
	95% Percentile 99% Percentile Note: DL/2 is not a recommended method.  OS UG/KG BENZO(A)PYRENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG BENZO(A)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute compute to compute the comput	General  N/A  General  N/A  General  N/A  General  N/A  General  N/A	Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! ZO(A)PYRENE  (br_na) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!	30
	95% Percentile 99% Percentile Note: DL/2 is not a recommended method.  OS UG/KG BENZO(A)PYRENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG  It is suggested to collect at least 8 to lf possible, compute and collect Data Qua  OS UG/KG BENZO(A)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute data set for variable OS UG  It is suggested to collect at least 8 to	General  O N/A  s data set tte reliable //KG BENZ  O O O N/A  General  O N/A  General  O N/A  Co O O O O O O O O O O O O O O O O O O	Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! ZO(A)PYRENE  (br_na) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!	0 100

			o   m			
	OS UG/KG BENZO(A)PYRENE  (so_ss)					
	1 ( ) ( ) ( )					
		General	Statistics			
* *	Number of Valid Data	40		Number of Det	ected Data	11
	Number of Distinct Detected Data	10		Number of Non-E	etect Data	29
	Tolerance Factor			Percent N	on-Detects	72.50%
	Number of Missing Values	75				
	Raw Statistics		Log	g-transformed Statis		0.000
1 1	Minimum Detected				n Detected	
	Maximum Detected  Mean of Detected				n Detected of Detected	
	SD of Detected				of Detected	
	Minimum Non-Detect				Non-Detect	
f 1	Maximum Non-Detect	_		Maximum I		
	Maximum Non-Detect	310		Waxiiiluiii i	NOII-Detect	3.737
	Data with Multiple Detection Limits		Single	Detection Limit Sc	enario	
	Note: Data have multiple DLs - Use of KM Method is	recommen		d as Non-Detect with		40
	For all methods (except KM, DL/2, and ROS Methods			ated as Detected with		
. 1	Observations < Largest ND are treated as NDs			ngle DL Non-Detect F		
. 1	,					
		Backgroun	d Statistics			
	Normal Distribution Test with Detected Values	Only	Lognormal Distrib	oution Test with Dete		
	Shapiro Wilk Test Statistic			Shapiro Wilk Te		
* 1	5% Shapiro Wilk Critical Value			5% Shapiro Wilk Cr		
	Data not Normal at 5% Significance Leve	l	Data appear L	ognormal at 5% Sig	nificance L	evel
3 0	Assuming Normal Distribution	ı	Assum	ning Lognormal Dist		
	DL/2 Substitution Method			DL/2 Substitut		
	Mean				Log Scale)	
		29.67			Log Scale)	
2 4	95% UTL 90% Coverage			95% UTL 90%		
3 4	95% UPL (t)				5% UPL (t)	
	90% Percentile (z) 95% Percentile (z)				ercentile (z) ercentile (z)	
1 1	99% Percentile (z)				rcentile (z)	
1 *	99% Percentile (2)	170.4		99% PE	rcenne (z)	221.7
	Maximum Likelihood Estimate(MLE) Method	NI/A		Log Ri	OS Method	
	Maximum Eikelinood Estimate(MEE) Wethod	IN/A		Mean in Ori		63 18
. ,					ginal Scale ginal Scale	
1 1					Log Scale	
					Log Scale	
				95% UTL 90%		
					5% UPL (t)	
* 1					rcentile (z)	
				95% Pe	rcentile (z)	79.77
					rcentile (z)	
	Gamma Distribution Test with Detected Values			on Test with Detecte		
	k star (bias corrected)		Data appear Gami	ma Distributed at 5%	Significand	e Level
	Theta Star					
	nu star	481.3				
	A-D Test Statistic		No	onparametric Statist		T
	5% A-D Critical Value			Kaplan-Meier (K	,	00.==
	K-S Test Statistic					63.55
	5% K-S Critical Value					12.41
	Data appear Gamma Distributed at 5% Significan	ce Level	050		SE of Mean	
	Accuming Commo Dietribution		95%	KM UTL with 90%		
	Assuming Gamma Distribution			95% KM Cheb	yshev UPL KM UPL (t)	
	Gamma ROS Statistics with Extrapolated Data	64.14			rcentile (z)	

	у у с р 1		0 1	1 1 8	,
	Median	64.07	<u> </u>	95% Percentile (z)	83.06
		9.416		99% Percentile (z)	
		44.85		33 % Fercentile (2)	JZ.4Z
	Theta star		Gamma RO	S Limits with Extrapolated Dat	
	Nu star			erty (WH) Approx. Gamma UPL	
	95% Percentile of Chisquare (2k)			ley (HW) Approx. Gamma UPL	
	0070 1 010011tillo 01 01110quaro (211)	112.0		nma UTL with 90% Coverage	
	90% Percentile	76.68		mma UTL with 90% Coverage	
	95% Percentile		007011117 (pp.10711 cd.	a 0.12 00% 00.0ago	00.00
	99% Percentile				
	Note: DL/2 is not a recommended method.				
	OS UG/KG BENZO(B)FLUORANTHENE  (br_na)				
2 0					
1 1			Statistics		
1 1	Total Number of Observations	0	N	umber of Distinct Observations	0
1 1	Tolerance Factor	N/A		Number of Missing Values	30
			only has 0 observation		
1 1	Data set is too small to comp				
	The data set for variable OS UG/KG	BENZO(B	)FLUORANTHENE  (t	or_na) was not processed!	
1 0	11.	40.1			
1.1	It is suggested to collect at least 8 t				
1 1	If possible, compute and collect Data Qua	ility Object	ives (DQO) based san	npie size and analytical results	i.
1 1					
	OS UG/KG BENZO(B)FLUORANTHENE  (so_sb)				
1 1		General	Statistics		
	Total Number of Observations		1	umber of Distinct Observations	0
	Tolerance Factor			Number of Missing Values	
			II.		l
	Warning: Thi	s data set	only has 0 observation	ns!	
* 1	Data set is too small to comp				
	The data set for variable OS UG/KG	BENZO(B	)FLUORANTHENE  (s	so_sb) was not processed!	
	It is suggested to collect at least 8 t				
	If possible, compute and collect Data Qua	lity Object	ives (DQO) based san	nple size and analytical results	
	OULOWOIDENZO/DIELLODANTHENEL ()				
1 1	OS UG/KG BENZO(B)FLUORANTHENE  (so_ss)				
		Conorol	Statistics		
	Number of Valid Data		GIGUSUUS	Number of Detected Data	13
	Number of Valid Data  Number of Distinct Detected Data			Number of Non-Detect Data	
	Tolerance Factor			Percent Non-Detects	
1 1	Number of Missing Values			i ercent non-perects	07.00%
	raumber of wissing values	,,,			
	Raw Statistics		Lon	-transformed Statistics	
	Minimum Detected	51	Log	Minimum Detected	3.932
* 1	Maximum Detected			Maximum Detected	
4 1	Mean of Detected			Mean of Detected	
* 1	SD of Detected			SD of Detected	
	Minimum Non-Detect			Minimum Non-Detect	
• •	Maximum Non-Detect			Maximum Non-Detect	
	maximum ron beloot				307
4 1	Data with Multiple Detection Limits	1	Single	Detection Limit Scenario	
	Note: Data have multiple DLs - Use of KM Method is	recommen	_	d as Non-Detect with Single DL	40

	Y 1 0 1	,		
	For all methods (except KM, DL/2, and ROS Methods	<u> </u>	Number treated as Detected with Single DL	0
	Observations < Largest ND are treated as NDs	>),	Single DL Non-Detect Percentage	
	Observations > Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.007
1 2 1		Dookarous	ad Ctatiatian	
1 1 1			nd Statistics	- 0-4
	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	
	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
	5% Shapiro Wilk Critical Value		5% Shapiro Wilk Critical Value	
	Data not Normal at 5% Significance Leve	l	Data appear Lognormal at 5% Significance Le	evel
1 1 1				
	Assuming Normal Distribution		Assuming Lognormal Distribution	
F 3 *	DL/2 Substitution Method		DL/2 Substitution Method	
	Mean	109	Mean (Log Scale)	4.653
	SD	27.12	SD (Log Scale)	
1 1 1	95% UTL 90% Coverage	154.8	95% UTL 90% Coverage	172.6
1 1 1	95% UPL (t)		95% UPL (t)	173.5
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)		99% Percentile (z)	
	33 70 1 CICCITATO (2)	172	33701 Creentile (2)	200.0
	Maximum Likelihood Estimate(MLE) Method	NI/A	Log ROS Method	
	Mayillalli Fivelliloon Estilligre(MFE) Meriloo	111/71		77 50
			Mean in Original Scale SD in Original Scale	
			Mean in Log Scale	
			SD in Log Scale	
			95% UTL 90% Coverage	112.6
. ,			95% UPL (t)	
			90% Percentile (z)	
			95% Percentile (z)	111.4
* 1			99% Percentile (z)	130.9
	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values C	Only
	k star (bias corrected)	9.273	Data appear Gamma Distributed at 5% Significand	e Level
	Theta Star	8.486		
* * 1	nu star	241.1		
* 1				
	A-D Test Statistic	0.688	Nonparametric Statistics	
	A-D Test Statistic 5% A-D Critical Value		Nonparametric Statistics Kaplan-Meier (KM) Method	
	5% A-D Critical Value	0.734	Kaplan-Meier (KM) Method	78 69
* * *	5% A-D Critical Value K-S Test Statistic	0.734 0.225	Kaplan-Meier (KM) Method Mean	
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	0.734 0.225 0.237	Kaplan-Meier (KM) Method Mean SD	24.26
	5% A-D Critical Value K-S Test Statistic	0.734 0.225 0.237	Kaplan-Meier (KM) Method Mean SD SE of Mean	24.26 7.003
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan	0.734 0.225 0.237	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage	24.26 7.003 119.7
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan Assuming Gamma Distribution	0.734 0.225 0.237	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage 95% KM Chebyshev UPL	24.26 7.003 119.7 185.8
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data	0.734 0.225 0.237 <b>ce Level</b>	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)	24.26 7.003 119.7 185.8 120.1
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean	0.734 0.225 0.237 <b>ce Level</b> 79.91	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)	24.26 7.003 119.7 185.8 120.1 109.8
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)	24.26 7.003 119.7 185.8 120.1 109.8 118.6
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)	24.26 7.003 119.7 185.8 120.1 109.8 118.6
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  99% Percentile (z)	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star	0.734 0.225 0.237 ce Level 79.91 81.41 18.94 16.81 4.753	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Harwins With Extrapolated Data  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Harwins With Extrapolated Data  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Harwins With Extrapolated Data  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Harwins With Extrapolated Data  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Harwins With Extrapolated Data  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6
N	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Theta star Nu star  95% Percentile of Chisquare (2k)  90% Percentile 95% Percentile	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Harwins With Extrapolated Data  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6
N	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Theta star Nu star  95% Percentile of Chisquare (2k)  90% Percentile 95% Percentile	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Harwins With Extrapolated Data  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6
7 3 4	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Theta star Nu star  95% Percentile of Chisquare (2k)  90% Percentile 95% Percentile	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Harwins With Extrapolated Data  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6
7 3 4	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Theta star Nu star 95% Percentile of Chisquare (2k)  90% Percentile 95% Percentile 99% Percentile	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Harwins With Extrapolated Data  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Theta star Nu star 95% Percentile of Chisquare (2k)  90% Percentile 95% Percentile 99% Percentile	0.734 0.225 0.237 <b>ce Level</b> 79.91  81.41  18.94  16.81  4.753  1345  48.15	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Harwins With Extrapolated Data  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6
4 3 4	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Theta star Nu star 95% Percentile of Chisquare (2k)  90% Percentile 95% Percentile 99% Percentile 99% Percentile Note: DL/2 is not a recommended method.  DS UG/KG BENZO(G,H,I)PERYLENE  (br_na)	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15 105.7 114.4 132.1	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL  95% WH Approx. Gamma UTL with 90% Coverage  95% HW Approx. Gamma UTL with 90% Coverage	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 a 115 115.5 114.6 115.1
	5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan  Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Theta star Nu star 95% Percentile of Chisquare (2k)  90% Percentile 95% Percentile 99% Percentile	0.734 0.225 0.237 <b>ce Level</b> 79.91 81.41 18.94 16.81 4.753 1345 48.15 105.7 114.4 132.1	Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL  95% WH Approx. Gamma UTL with 90% Coverage  95% HW Approx. Gamma UTL with 90% Coverage	24.26 7.003 119.7 185.8 120.1 109.8 118.6 135.1 115.5 114.6 115.1

		h	e			1	r.	r
1 7 1 1		•			•	•		
	Warning: This	s data set	only has 0	observatio	ns!			
	Data set is too small to compu							
	The data set for variable OS UG/KG	BENZO(	G,H,I)PER`	YLENE  (b	r_na) was	not proces	ssed!	
* 4 1 1								
* * 1 *	It is suggested to collect at least 8 to							
	If possible, compute and collect Data Qua	lity Objecti	ves (DQO)	) based sa	mple size	and analyt	ical results	· .
	OS UG/KG BENZO(G,H,I)PERYLENE  (so_sb)							
		Conorol	Statistics					
	Total Number of Observations		Statistics	N	dumbor of	Distinct Ob	convotions	٥
* * * 3	Tolar Number of Observations  Tolerance Factor	N/A		I.		ber of Miss		-
	Tolerance Factor	IN/A			INGIII	DCI OI WIISS	ing values	100
	Warning: This	s data set	only has 0	ohservatio	nsl			
	Data set is too small to compu					estimates!		
* * * 1	The data set for variable OS UG/KG						ssed!	
1 1 1 1		1	,,-					
* * * *	It is suggested to collect at least 8 to	o 10 obser	vations be	fore using	these stat	istical meti	nods!	
	If possible, compute and collect Data Qua							) <u>.</u>
				·	•			
8 8 8 3								
* * * *	OS UG/KG BENZO(G,H,I)PERYLENE  (so_ss)							
			Statistics					
* * * 1	Number of Valid Data					nber of Dete		
	Number of Distinct Detected Data				Numbe	er of Non-D		
	Tolerance Factor					Percent No	on-Detects	87.50%
	Number of Missing Values	75						
			T					
	Raw Statistics			Lo	g-transfor	med Statis		4.007
	Minimum Detected						n Detected	
* * 1 *	Maximum Detected  Mean of Detected						n Detected of Detected	
* * 1 1	SD of Detected						of Detected	
1 1 1	Minimum Non-Detect					Minimum N		
1 1 1	Maximum Non-Detect					Maximum N		
* * 1 *	Waximum Non Beleet	010				Waxiiiiaiiii	ton Detect	0.707
	Data with Multiple Detection Limits			Singl	e Detectio	n Limit Sce	enario	
	Note: Data have multiple DLs - Use of KM Method is	recommen	Nur			Detect with		40
F F 1 1	For all methods (except KM, DL/2, and ROS Methods					tected with		
* * 1 *	Observations < Largest ND are treated as NDs	- /,	-			on-Detect F		
8 4 7 4	<u> </u>		'					
	Warning: There	are only 5	Detected V	/alues in th	nis data			
	Note: It should be noted that eve	n though l	ootstrap n	nay be per	formed on	this data s	et	
* * * 2	the resulting calculations r	nay not be	reliable er	nough to d	raw concl	usions		
	It is recommended to have 10-15 or mo	re distinct	observatio	ns for acc	urate and	meaningfu	I results.	
			d Statistics		=			
	Normal Distribution Test with Detected Values		Lognoi	rmal Distri		t with Dete		
	Shapiro Wilk Test Statistic					oiro Wilk Te		
	5% Shapiro Wilk Critical Value					iro Wilk Cri		
	Data appear Normal at 5% Significance Lev	/el	Data	a appear L	_ognormal	at 5% Sigr	nificance L	evel
	Assuming Normal Distribution			Assur	-	ormal Distr		
	DL/2 Substitution Method	1170			DL/:	2 Substituti		4744
		117.3					Log Scale)	
1	<u>SD</u>	22.05				SD (	Log Scale)	U.238

	Y Y C D I	,	0 R 1 T E	
4 4 1	95% UTL 90% Coverage	15/16	95% UTL 90% Coverage	171 /
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)		99% Percentile (z)	
	99% Percentile (2)	100.0	99% Percentile (2)	199.5
# 1	Maximum Likelihood Estimate(MLE) Method	NI/A	Log ROS Method	
	Maximum Likelinood Estimate(MLE) Metriod	IN/A	Mean in Original Scale	
			SD in Original Scale	
			Mean in Log Scale	
* 1			SD in Log Scale	
			95% UTL 90% Coverage 95% UPL (t)	
			90% Percentile (z)	
. ,			95% Percentile (z)	
1.1			99% Percentile (z)	107.8
	O Distribution To touth Data to d Value	0-1-	Data Distribution To stock Data and Moleco A	<b>3-1</b> -
	Gamma Distribution Test with Detected Values		Data Distribution Test with Detected Values (	
	k star (bias corrected)		Data appear Normal at 5% Significance Lev	eı
1 1	Theta Star			
	nu star	10.01		-
	A D T 10: 11:	0.500	Management Or et al.	
	A-D Test Statistic		Nonparametric Statistics	1
, ,	5% A-D Critical Value		Kaplan-Meier (KM) Method	
, ,	K-S Test Statistic		Mean	
1 1	5% K-S Critical Value			16.91
, ,	Data appear Gamma Distributed at 5% Significan	ce Levei	SE of Mean	
2 1	4 1 0 51:11:11		95% KM UTL with 90% Coverage	
3 4	Assuming Gamma Distribution	I	95% KM Chebyshev UPL	
7 1	Gamma ROS Statistics with Extrapolated Data	00.40	95% KM UPL (t)	
, ,	Mean		90% Percentile (z)	
	Median		95% Percentile (z)	
		14.06	99% Percentile (z)	107.7
		20.48		
	Theta star		Gamma ROS Limits with Extrapolated Dat	
1.1	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	
	95% Percentile of Chisquare (2k)	56.89	95% Hawkins Wixley (HW) Approx. Gamma UPL	
	000/ 5	00.40	95% WH Approx. Gamma UTL with 90% Coverage	
1 4	90% Percentile		95% HW Approx. Gamma UTL with 90% Coverage	95.74
7 1	95% Percentile 99% Percentile			
	Note: DL/2 is not a recommended method.	1.00.0		
1 1	OS UG/KG BENZO(K)FLUORANTHENE  (br_na)			
			<u> </u>	
		1	Statistics	1-
	Total Number of Observations		Number of Distinct Observations	
4 3	Tolerance Factor	N/A	Number of Missing Values	30
	Warning: Thi	s data set	only has 0 observations!	
			and meaningful statistics and estimates!	
			)FLUORANTHENE  (br_na) was not processed!	
1 1		• (1)	,	
1 7	It is suggested to collect at least 8 to	o 10 obse	rvations before using these statistical methods!	
			ives (DQO) based sample size and analytical results	
	p. 200 2011paire anna 2011.2011.2011	, _ 5,000	and and analysis of the second	-
1 1 1				
	OS UG/KG BENZO(K)FLUORANTHENE  (so_sb)			
		General	Statistics	
		Gonordi		

1 1 1	Y E C D E	h	
	Tatal Number of Observations	0	Number of Distinct Observations O
	Total Number of Observations		Number of Distinct Observations 0
	Tolerance Factor	N/A	Number of Missing Values 100
			only has 0 observations!
			and meaningful statistics and estimates!
	The data set for variable OS UG/KG	BENZO(K)	FLUORANTHENE  (so_sb) was not processed!
1 * *			vations before using these statistical methods!
1 1 *	If possible, compute and collect Data Qua	lity Objecti	ves (DQO) based sample size and analytical results.
1 1 1			
1 1 1			
	OS UG/KG BENZO(K)FLUORANTHENE  (so_ss)		
		1	Statistics
1 1 1	Number of Valid Data		Number of Detected Data 7
1 1 *	Number of Distinct Detected Data		Number of Non-Detect Data 33
1 1 *	Tolerance Factor		Percent Non-Detects 82.50
	Number of Missing Values	75	
3 1 1			
1 1 1	Raw Statistics		Log-transformed Statistics
1 1 1	Minimum Detected	52	Minimum Detected 3.95
	Maximum Detected	110	Maximum Detected 4.7
1 1 1	Mean of Detected	65.29	Mean of Detected 4.146
1 * *	SD of Detected	20.48	SD of Detected 0.26
1 1 1	Minimum Non-Detect	170	Minimum Non-Detect 5.136
1 1 1	Maximum Non-Detect	310	Maximum Non-Detect 5.73
1 * *			
1 * *	Data with Multiple Detection Limits	•	Single Detection Limit Scenario
1 + 1	Note: Data have multiple DLs - Use of KM Method is	recommen	Number treated as Non-Detect with Single DL 40
1 + 1	For all methods (except KM, DL/2, and ROS Methods	s),	Number treated as Detected with Single DL 0
1 * 1	Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage 100.0
			Single DE Non-Detect Fercentage 100.
3 * *	,		Single DE Non-Detect i el centage 100.
3 4 1			Single DE Non-Detect Percentage 100.0
1 * *	Warning: There		Detected Values in this data
1 * *	Warning: There	en though l	Detected Values in this data pootstrap may be performed on this data set
1 * T	Warning: There	en though l	Detected Values in this data
1 * * * 1 1 * 1 1 1 1 1 1 1 1 1 1 1 1 1	Warning: There a Note: It should be noted that even the resulting calculations in the second calculations calculated calculations in the second calculated calculat	en though l may not be	Detected Values in this data pootstrap may be performed on this data set reliable enough to draw conclusions
1 * T	Warning: There a Note: It should be noted that even the resulting calculations in the second calculations calculated calculations in the second calculated calculat	en though l may not be	Detected Values in this data pootstrap may be performed on this data set
1 * T	Warning: There and Note: It should be noted that even the resulting calculations of the recommended to have 10-15 or more	en though I may not be ore distinct	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions observations for accurate and meaningful results.
1 * *  1 * *  1 * *  1 * *  1 * *  1 * *  1 * *	Warning: There a Note: It should be noted that even the resulting calculations of the recommended to have 10-15 or more than the second terms of t	en though I may not be ore distinct Backgroun	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions pobservations for accurate and meaningful results.
	Warning: There a Note: It should be noted that even the resulting calculations of the recommended to have 10-15 or more than the recommended to have 10-15 or more than the recommended to have 10-15 or more than the recommendation of the recom	en though I may not be ore distinct Backgroun Only	Detected Values in this data pootstrap may be performed on this data set reliable enough to draw conclusions observations for accurate and meaningful results.  d Statistics Lognormal Distribution Test with Detected Values On
	Warning: There Note: It should be noted that eve the resulting calculations i  It is recommended to have 10-15 or mo  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic	en though I may not be ore distinct Backgroun Only 0.673	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions  observations for accurate and meaningful results.  d Statistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic   0.738
	Warning: There Note: It should be noted that eve the resulting calculations i  It is recommended to have 10-15 or mo  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	en though Is may not be pre distinct Backgroun Only 0.673 0.803	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions  observations for accurate and meaningful results.  d Statistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic   0.738 5% Shapiro Wilk Critical Value   0.803
	Warning: There Note: It should be noted that eve the resulting calculations i  It is recommended to have 10-15 or mo  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic	en though Is may not be pre distinct Backgroun Only 0.673 0.803	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions  observations for accurate and meaningful results.  d Statistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic   0.738
	Note: It should be noted that even the resulting calculations in t	en though Is may not be pre distinct Backgroun Only 0.673 0.803	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions observations for accurate and meaningful results.  d Statistics Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 0.733 5% Shapiro Wilk Critical Value 0.803 Data not Lognormal at 5% Significance Level
	Warning: There Note: It should be noted that eve the resulting calculations i  It is recommended to have 10-15 or mo  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution	en though by may not be be be distinct  Backgroun Only  0.673  0.803	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions observations for accurate and meaningful results.  d Statistics Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 0.738 5% Shapiro Wilk Critical Value 0.803 Data not Lognormal at 5% Significance Level Assuming Lognormal Distribution
	Warning: There is Note: It should be noted that ever the resulting calculations is the resulting calculations is lit is recommended to have 10-15 or more in the image of the	en though became not become distinct  Backgroun  Only  0.673  0.803	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions observations for accurate and meaningful results.  d Statistics Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 0.733 5% Shapiro Wilk Critical Value 0.803 Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method
	Warning: There Note: It should be noted that eve the resulting calculations of It is recommended to have 10-15 or mo Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution DL/2 Substitution Method Mean	en though be may not be bre distinct  Backgroun Only  0.673  0.803	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions observations for accurate and meaningful results.  d Statistics Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 0.738 5% Shapiro Wilk Critical Value 0.803 Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) 4.702
	Warning: There Note: It should be noted that eve the resulting calculations of It is recommended to have 10-15 or mo Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution DL/2 Substitution Method Mean SD	en though by may not be be be distinct  Backgroun Only 0.673 0.803 I	Detected Values in this data Depotstrap may be performed on this data set Depotstrap may be performed on this data set Depots reliable enough to draw conclusions Descriptions for accurate and meaningful results.  d Statistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 0.738 Shapiro Wilk Critical Value 0.803 Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) 4.703 SD (Log Scale) 0.299
	Warning: There a Note: It should be noted that ever the resulting calculations of the resulting	en though by may not be be be distinct  Backgroun Only 0.673 0.803 I 114.1 26.09 158.1	Detected Values in this data Depotstrap may be performed on this data set Depotstrap may be performed on this data set Depots reliable enough to draw conclusions  Observations for accurate and meaningful results.  I d Statistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 0.738 Shapiro Wilk Critical Value 0.803 Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) 4.703 SD (Log Scale) 0.293 95% UTL 90% Coverage 180.3
	Warning: There is Note: It should be noted that ever the resulting calculations in the resulting calculations in the resulting calculations in the resulting calculations in the resulting calculations in the resulting calculations.  It is recommended to have 10-15 or more than the resulting calculations. Shapiro Wilk Test Statistic Shapiro Wilk Test Statistic Shapiro Wilk Critical Value Data not Normal at 5% Significance Leve Data not Normal at 5% Significance Leve Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UTL 90% Coverage 95% UTL 90% Coverage 95% UTL 95%	en though by may not be bre distinct  Backgroun Only 0.673 0.803 I  114.1 26.09 158.1 158.6	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions  observations for accurate and meaningful results.  d Statistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 0.738 5% Shapiro Wilk Critical Value 0.803 Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) 4.703 SD (Log Scale) 0.29 95% UTL 90% Coverage 180.3 95% UPL (t) 181
	Warning: There is Note: It should be noted that ever the resulting calculations is the resulting calculations is lit is recommended to have 10-15 or more in the property of t	en though by may not be bre distinct  Backgroun Only 0.673 0.803 I  114.1 26.09 158.1 158.6 147.5	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions  observations for accurate and meaningful results.  d Statistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 0.738 5% Shapiro Wilk Critical Value 0.803 Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) 4.703 SD (Log Scale) 0.293 95% UTL 90% Coverage 180.3 95% UPL (t) 181 90% Percentile (z) 159.8
	Warning: There is Note: It should be noted that ever the resulting calculations is the resulting calculations is lit is recommended to have 10-15 or more than the property of	en though by may not be bre distinct  Backgroun Only 0.673 0.803 I  114.1 26.09 158.1 158.6 147.5	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions  observations for accurate and meaningful results.  d Statistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 0.738 5% Shapiro Wilk Critical Value 0.803 Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) 4.703 SD (Log Scale) 0.29 95% UTL 90% Coverage 180.3 95% UPL (t) 181 90% Percentile (z) 159.9
	Warning: There is Note: It should be noted that ever the resulting calculations is the resulting calculations is lit is recommended to have 10-15 or more in the property of t	en though by may not be bre distinct  Backgroun Only 0.673 0.803 I  114.1 26.09 158.1 158.6 147.5	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions  observations for accurate and meaningful results.  d Statistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic 0.738 5% Shapiro Wilk Critical Value 0.803 Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) 4.703 SD (Log Scale) 0.293 95% UTL 90% Coverage 180.3 95% UPL (t) 181 90% Percentile (z) 159.8
	Warning: There a Note: It should be noted that ever the resulting calculations of the resulting calculations of the resulting calculations of the resulting calculations of the resulting calculations of the resulting calculations of the resulting calculations of the resulting calculations.  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UTL 90% Coverage 95% UTL 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)	en though by may not be	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions  observations for accurate and meaningful results.  d Statistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic   0.738 5% Shapiro Wilk Critical Value   0.803 Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale)   4.703 SD (Log Scale)   0.293 95% UTL   90% Coverage   180.3 95% UPL (t)   181 90% Percentile (z)   159.9 95% Percentile (z)   177.8 99% Percentile (z)   216.9
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	Warning: There a Note: It should be noted that ever the resulting calculations of the resulting calculations of the resulting calculations of the resulting calculations of the resulting calculations of the resulting calculations of the resulting calculations of the resulting calculations.  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data not Normal at 5% Significance Leve  Assuming Normal Distribution  DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UTL 90% Coverage 95% UTL 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)	en though by may not be	Detected Values in this data pootstrap may be performed on this data set preliable enough to draw conclusions  observations for accurate and meaningful results.  d Statistics  Lognormal Distribution Test with Detected Values On Shapiro Wilk Test Statistic   0.738 5% Shapiro Wilk Critical Value   0.803 Data not Lognormal at 5% Significance Level  Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale)   4.703 SD (Log Scale)   0.29 95% UTL   90% Coverage   180.3 95% UPL (t)   181 90% Percentile (z)   159.9 95% Percentile (z)   177.8 99% Percentile (z)   216.9 Log ROS Method Mean in Original Scale   64.33 SD in Original Scale   13.33
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3 1	<del></del>		90% Percentile (z)	21 1 <i>I</i>
3 4			95% Percentile (z)	
3 1			99% Percentile (z)	
			33% Fercentile (2)	33.31
	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values (	Only
1 *	k star (bias corrected)		Data do not follow a Discernable Distribution (0	
1 1	Theta Star		244 40 1101 1011011 4 210001114210 2101112411011 (	
	nu star			
1 1				
	A-D Test Statistic	0.981	Nonparametric Statistics	
	5% A-D Critical Value		Kaplan-Meier (KM) Method	
	K-S Test Statistic	0.358	Mean	65.29
1 1	5% K-S Critical Value	0.312	SD	18.96
	Data not Gamma Distributed at 5% Significance	Level	SE of Mean	7.739
			95% KM UTL with 90% Coverage	97.32
	Assuming Gamma Distribution	I.	95% KM Chebyshev UPL	148.9
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	97.62
1 1	Mean		90% Percentile (z)	
1 1	Median		95% Percentile (z)	
	4	13.3	99% Percentile (z)	109.4
	k star			
	Theta star		Gamma ROS Limits with Extrapolated Dat	
	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	90.07
	95% Percentile of Chisquare (2k)	63.2	95% Hawkins Wixley (HW) Approx. Gamma UPL	
	22/ 2		95% WH Approx. Gamma UTL with 90% Coverage	
	90% Percentile 95% Percentile		95% HW Approx. Gamma UTL with 90% Coverage	90.1
1 1	99% Percentile	101.0		
1 1	Note: DL/2 is not a recommended method.  OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I	br_na)		
t - t - t - t - t - t - t - t - t - t -			Statistics	
6 8 6 8 6 9		General	Statistics  Number of Distinct Observations	0
f f f f f f f f f f f f f f f f f f f	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I	General		
1 T T T T T T T T T T T T T T T T T T T	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I	<b>General</b>	Number of Distinct Observations	
t t z t z t z t z t z t z t z t z t z t	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I Total Number of Observations Tolerance Factor	General 0 N/A	Number of Distinct Observations Number of Missing Values	
* * * * * * * * * * * * * * * * * * *	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I	General 0 N/A	Number of Distinct Observations Number of Missing Values only has 0 observations!	
	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu	General  0  N/A  s data set onte reliable	Number of Distinct Observations Number of Missing Values only has 0 observations! and meaningful statistics and estimates!	
	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu	General  0  N/A  s data set onte reliable	Number of Distinct Observations Number of Missing Values only has 0 observations!	
	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I	General  0  N/A  s data set to te reliable (2-CHLOR	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  OETHOXY)METHANE  (br_na) was not processed!	
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	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG BIS  It is suggested to collect at least 8 to	General  0  N/A  s data set lite reliable (2-CHLOR	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  OETHOXY)METHANE  (br_na) was not processed!	30
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	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG BIS(  It is suggested to collect at least 8 to the lift possible, compute and collect Data Quate OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (see Section 1)	General  O N/A  s data set on the reliable (2-CHLOR on 10 obserol)  so_sb)  General	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! OETHOXY)METHANE  (br_na) was not processed!  vations before using these statistical methods!  ves (DQO) based sample size and analytical results  Statistics	30
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	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG BIS(  It is suggested to collect at least 8 to lif possible, compute and collect Data Quate of OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (see Total Number of Observations Tolerance Factor	General  0  N/A  s data set te reliable (2-CHLOR  0 10 obser lity Object  so_sb)  General  0  N/A	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! OETHOXY)METHANE  (br_na) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations	30
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	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (I  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG BIS(Internal Internal	General  O N/A  s data set of the reliable (2-CHLOR of 10 observal)  General  O N/A  S data set of the reliable (2-CHLOR of 10 observal)  O N/A  s data set of the reliable (2-CHLOR of 10 observal)  O 10 observal	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! OETHOXY)METHANE  (br_na) was not processed!  vations before using these statistical methods!  ves (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! OETHOXY)METHANE  (so_sb) was not processed!  vations before using these statistical methods!	0 100
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	OS UG/KG BIS(2-CHLOROETHOXY)METHANE  (so_ss)						
* * * *	Gener	al Statistics					
1 1 4 2	Number of Valid Data 40			Num	ber of Detec	ted Data	0
* * * 1	Number of Distinct Detected Data 0			Numbe	er of Non-De	tect Data	40
* * * *	Warning: All observations are Non-Detects (NDs), t Specifically, sample mean, UCLs, UPLs, and other sta The Project Team may decide to use alternative site specific	atistics are als	so NDs lyir	ig below t	the largest d	letection l	imit!
						(9-,	, ,
	The data set for variable OS UG/KG BIS(2-CHLC	ROETHOXY	)METHANI	E  (so_ss	) was not pr	ocessed!	
1 + + 1							
	OS UG/KG BIS(2-CHLOROETHYL)ETHER  (br_na)						
	0	-1.04-41-41					
	Gener  Total Number of Observations 0	al Statistics	NI	umbor of	Distinct Obs	onvotions	٥
	Tolar Number of Observations of Tolerance Factor N/A		IN		ber of Missir		-
	Tolerance Factor 1477			Nam	DCI OI WIIOOII	ig values	00
	Warning: This data se						
	Data set is too small to compute reliab The data set for variable OS UG/KG BIS(2-CH					oood!	
	The data set for variable OS OG/KG BIS(2-Ch	LORUEINII	L)ETREKI	(Dr_na) w	as not proce	esseu!	
	It is suggested to collect at least 8 to 10 obs	ervations bef	ore using t	hese stat	istical metho	ods!	
	If possible, compute and collect Data Quality Obje						i.
	OS UG/KG BIS(2-CHLOROETHYL)ETHER  (so_sb)						
1 + 1 +	OS OG/RG BIS(2-CHEOROETHTE)ETHEN  (SO_SD)						
	Gener	al Statistics					
1 + 1 1	Total Number of Observations 0		N	umber of	Distinct Obs	ervations	0
	Tolerance Factor N/A			Num	ber of Missin	g Values	100
	Warning: This data se	et only has 0 o	observation	ns!			
1 0 1 1	Data set is too small to compute reliab				estimates!		
* * 3 *	The data set for variable OS UG/KG BIS(2-CH	LOROETHYL	_)ETHER  (	(so_sb) w	as not proce	essed!	
	It is suggested to collect at least 8 to 10 obs						
X + 3 3	If possible, compute and collect Data Quality Obje	ctives (DQO)	pased san	npie size	and analytic	aı resuits	·•
* * 1 1							
	OS UG/KG BIS(2-CHLOROETHYL)ETHER  (so_ss)						
		al Statistics		Nime	har of Data	stad Data	٥
1 + 1 +	Number of Valid Data 40  Number of Distinct Detected Data 0				nber of Detector of Non-De		
	Trained of Biolinet Betested Bata 0				J. 01 11011 DC	.sor Data	
	Warning: All observations are Non-Detects (NDs), t						
1 + 1 1	Specifically, sample mean, UCLs, UPLs, and other sta			•			
	The Project Team may decide to use alternative site specific	values to es	timate env	ironment	al paramete	rs (e.g., E	.PC, BTV).
* * * *	The data set for variable OSIUG/KGIBIS(2-CH	I ODOETHVI	\ETHEDI A	en eel w	ee not proce	ecodi	
	The data set for variable deflective process		-/	(30 <u>_</u> 33) W	as not proof		
* * * 1							
	OS UG/KG BIS(2-ETHYLHEXYL)PHTHALATE  (br_na)						
I							
	0	al Statiation					
	Gener  Total Number of Observations 0	al Statistics	NI	umber of	Distinct Obs	ervations	0

* * * 7	у г с г	h	0 E 1 1 E	r
	Tolerance Factor	N/A	Number of Missing Values	30
	Tolerance Factor	14/74	realities of wildering values	30
	)4/!Ti-!		anhahaa O ahaamadlanal	
* * * 1			only has 0 observations!	
			and meaningful statistics and estimates!	
	The data set for variable OS UG/KG BIS	S(2-ETHYL	_HEXYL)PHTHALATE  (br_na) was not processed!	
	It is suggested to collect at least 8 to	o 10 obser	vations before using these statistical methods!	
	If possible, compute and collect Data Qua	lity Objecti	ives (DQO) based sample size and analytical results	
1 + 1 1				
	OS UG/KG BIS(2-ETHYLHEXYL)PHTHALATE  (so	_sb)		
* * * 1		General	Statistics	
	Total Number of Observations		Number of Distinct Observations	0
	Tolerance Factor	N/A	Number of Missing Values	
* * 7 *	Tolerance Factor	14// (	Trainber of Missing Values	100
K + 2 1				
* * 1 1	Momine. Thi		anhi haa O ahaaniatianal	
* + 2 1			only has 0 observations!	
* * 2 *			and meaningful statistics and estimates!	
	i ne data set for variable OS UG/KG BIS	(2-ETHYL	.HEXYL)PHTHALATE  (so_sb) was not processed!	
			vations before using these statistical methods!	
* * 1 1	If possible, compute and collect Data Qua	lity Objecti	ives (DQO) based sample size and analytical results	
* * 3 *				
4 + 2 +				
	OS UG/KG BIS(2-ETHYLHEXYL)PHTHALATE  (so	_ss)		
		General	Statistics	
	Number of Valid Data		Number of Detected Data	2
	Number of Distinct Detected Data		Number of Non-Detect Data	
			only 2 Detected Values.	
* * * 1			I and reliable test statistics and estimates.	
	NO S	italistics w	ill be produced!	
	T.1	1.00	D	05.000/
	Tolerance Factor		Percent Non-Detects	95.00%
	Number of Missing Values	/5		
	Raw Statistics		Log-transformed Statistics	
	Minimum Detected	130	Minimum Detected	4.868
	Maximum Detected	160	Maximum Detected	
	Maximum Detected Mean of Detected		Maximum Detected  Mean of Detected	5.075
	<del>-</del>	145		5.075 4.971
	Mean of Detected SD of Detected	145 21.21	Mean of Detected SD of Detected	5.075 4.971 0.147
	Mean of Detected SD of Detected Minimum Non-Detect	145 21.21 230	Mean of Detected SD of Detected Minimum Non-Detect	5.075 4.971 0.147 5.438
T * * T	Mean of Detected SD of Detected	145 21.21 230	Mean of Detected SD of Detected	5.075 4.971 0.147 5.438
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect	145 21.21 230	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect	5.075 4.971 0.147 5.438
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits	145 21.21 230 310	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Single Detection Limit Scenario	5.075 4.971 0.147 5.438 5.737
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits  Note: Data have multiple DLs - Use of KM Method is	145 21.21 230 310 recommen	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario  Number treated as Non-Detect with Single DL	5.075 4.971 0.147 5.438 5.737
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits  Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods)	145 21.21 230 310 recommen	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario  Number treated as Non-Detect with Single DL Number treated as Detected with Single DL	5.075 4.971 0.147 5.438 5.737 40
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits  Note: Data have multiple DLs - Use of KM Method is	145 21.21 230 310 recommen	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario  Number treated as Non-Detect with Single DL	5.075 4.971 0.147 5.438 5.737 40
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits  Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods)	145 21.21 230 310 recommen	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario  Number treated as Non-Detect with Single DL Number treated as Detected with Single DL	5.075 4.971 0.147 5.438 5.737 40
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits  Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs	145 21.21 230 310 recommen	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage	5.075 4.971 0.147 5.438 5.737 40
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data see	145 21.21 230 310 recommen s),	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values.	5.075 4.971 0.147 5.438 5.737 40
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data see This may not be adequate enough to ce	145 21.21 230 310 recommen s),	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values. eaningful and reliable test statistics and estimates.	5.075 4.971 0.147 5.438 5.737 40 0 100.00%
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data see This may not be adequate enough to ce	145 21.21 230 310 recommen s),	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values.	5.075 4.971 0.147 5.438 5.737 40 0 100.00%
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data see This may not be adequate enough to co	145 21.21 230 310  recomments),  et has only ompute measures specific versions.	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values. eaningful and reliable test statistics and estimates. values to estimate environmental parameters (e.g., E	5.075 4.971 0.147 5.438 5.737 40 0 100.00%
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data see This may not be adequate enough to co	145 21.21 230 310  recomments),  et has only ompute measures specific versions.	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values. eaningful and reliable test statistics and estimates.	5.075 4.971 0.147 5.438 5.737 40 0 100.00%
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data see This may not be adequate enough to co	145 21.21 230 310  recomments),  et has only ompute measures specific versions.	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values. eaningful and reliable test statistics and estimates. values to estimate environmental parameters (e.g., E	5.075 4.971 0.147 5.438 5.737 40 0 100.00%
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data se This may not be adequate enough to co The Project Team may decide to use alternative site  Unless Data Quality Objectives (DQOs) have	21.21 230 310  recomments),  et has only ompute measure expecific value we been recomments.	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values. Paningful and reliable test statistics and estimates. Palues to estimate environmental parameters (e.g., Emet, it is suggested to collect additional observations	5.075 4.971 0.147 5.438 5.737 40 0 100.00%
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data se This may not be adequate enough to ce The Project Team may decide to use alternative site  Unless Data Quality Objectives (DQOs) have	21.21 230 310 recommen s), et has only ompute me e specific v ave been r	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values. Paningful and reliable test statistics and estimates. Palues to estimate environmental parameters (e.g., Emet, it is suggested to collect additional observations	5.075 4.971 0.147 5.438 5.737 40 0 100.00%
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect  Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data se This may not be adequate enough to ce The Project Team may decide to use alternative site  Unless Data Quality Objectives (DQOs) have	21.21 230 310 recommen s), et has only ompute me e specific v ave been r	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values. Paningful and reliable test statistics and estimates. Palues to estimate environmental parameters (e.g., Emet, it is suggested to collect additional observations	5.075 4.971 0.147 5.438 5.737 40 0 100.00%
	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data se This may not be adequate enough to ce The Project Team may decide to use alternative site Unless Data Quality Objectives (DQOs) have The number of detected data may not be ade Those methods will response.	21.21 230 310  recommen s),  et has only ompute me e specific v  ave been r  quate enoue	Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect  Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values. Paningful and reliable test statistics and estimates. Palues to estimate environmental parameters (e.g., Emet, it is suggested to collect additional observations	5.075 4.971 0.147 5.438 5.737 40 0 100.00%

1 1	However, results obtained	using 4 to	o 9 distinct values may not be reliable.	r
			ons for accurate and meaningful results and estimate	es.
, ,		Backgrour	nd Statistics	
	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	s Only
1 1	Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
3 3	5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
, ,	Data not Normal at 5% Significance Leve	l	Data not Lognormal at 5% Significance Lev	el
	Assuming Normal Distribution		Assuming Lognormal Distribution	
1 1	DL/2 Substitution Method		DL/2 Substitution Method	
		100.0		4.000
		126.3	Mean (Log Scale)	
		9.541	SD (Log Scale)	
	95% UTL 90% Coverage		95% UTL 90% Coverage	
2	95% UPL (t)		95% UPL (t)	
,	90% Percentile (z)		90% Percentile (z)	
_	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)	148.4	99% Percentile (z)	148.8
	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
1			Mean in Original Scale	N/A
			SD in Original Scale	N/A
			Mean in Log Scale	N/A
٠			SD in Log Scale	N/A
			95% UTL 90% Coverage	N/A
,			95% UPL (t)	N/A
7			90% Percentile (z)	N/A
,			95% Percentile (z)	N/A
			99% Percentile (z)	N/A
*			99% Percentile (2)	IN/A
	Commo Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values C	\mb.
	Gamma Distribution Test with Detected Values  k star (bias corrected)		Data Distribution Test with Detected Values C	
	Theta Star	N/A	Data do not follow a Discernable Distribution (0	.03)
	nu star	N/A		
1	A D T+ 04-4:-4:-	NI/A	None and a state of the state of	
1	A-D Test Statistic	N/A	Nonparametric Statistics	
,	5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	1.45
	K-S Test Statistic		Mean	
	5% K-S Critical Value		SD SE (Marrie	
1	Data not Gamma Distributed at 5% Significance	Level	SE of Mean	
,			95% KM UTL with 90% Coverage	
	Assuming Gamma Distribution	T	95% KM Chebyshev UPL	
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
	Mean	N/A	90% Percentile (z)	
	Median	N/A	95% Percentile (z)	
3	SD	N/A	99% Percentile (z)	179.9
7	k star	N/A		
*	Theta star	N/A	Gamma ROS Limits with Extrapolated Data	
	Nu star	N/A	95% Wilson Hilferty (WH) Approx. Gamma UPL	N/A
*	95% Percentile of Chisquare (2k)	N/A	95% Hawkins Wixley (HW) Approx. Gamma UPL	N/A
3			95% WH Approx. Gamma UTL with 90% Coverage	N/A
,	90% Percentile	N/A	95% HW Approx. Gamma UTL with 90% Coverage	N/A
•	95% Percentile	N/A		
	99% Percentile	N/A		
3	Note: DL/2 is not a recommended method.			
	OS UG/KG BUTYL BENZYL PHTHALATE  (br_na)			
	CO  Carita  DC   1 E DE   NE   1   1   1   1   NE   (1 E   NE   1   NE			
4			Statistics	0
	Total Number of Observations Tolerance Factor		Statistics  Number of Distinct Observations  Number of Missing Values	

	y ( )		0			1		
	<del> </del>							
	\\\\-\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\							
	Warning: This							
	Data set is too small to compu							
	The data set for variable OS UG/KG B	UTYL BE	NZYL PHTHA	ALATE  (b	or_na) wa	s not pro	cessed!	
* * * *	It is suggested to collect at least 8 to	10 obser	vations befor	e using th	nese stat	istical me	thods!	
4 6 8 1	If possible, compute and collect Data Qual	ity Objecti	ves (DQO) b	ased sam	ple size	and analy	tical resul	ts.
					•			
	OS UG/KG BUTYL BENZYL PHTHALATE  (so_sb)							
* * * 1	OSIOG/ROIDOTTE BENZTE PHTHALATEI (SO_SD)							
* * * 1			a					
			Statistics					
	Total Number of Observations			Nι			bservation	
	Tolerance Factor	N/A			Numl	per of Mis	sing Value	s 100
* * * 1								
	Warning: This	data set	only has 0 ob	servation	s!			
	Data set is too small to compu					estimates	l	
	The data set for variable OS UG/KG B							
* 1 * 1			19616FITITA		o_ou) W	as not pro	ocos <del>c</del> u!	
4 1 9 2	la la accompanda y collega de la Col-	10 -L	vedless had			ا داهما	اداممطة	
* 1 * 1	It is suggested to collect at least 8 to							
	If possible, compute and collect Data Qual	ity Objecti	ves (DQO) b	ased sam	iple size	and analy	tical resul	ts.
* 1 * *								
* 1 * 1	OS UG/KG BUTYL BENZYL PHTHALATE  (so_ss)							
* 1 * *	1\ = /							
		General	Statistics					
	Number of Valid Data				Num	har of Da	tected Dat	a 0
	Number of Distinct Detected Data				ivuii	טרו טו ספ	lected Date	alo
	Number of Distinct Detected Data				Niconolog	w of Nlow	Datast Dat	- 10
4 1 1 1		U			Numbe	er of Non-	Detect Dat	a 40
* 1 1 1								
4 1 1 2	Warning: All observations are Non-Detects	(NDs), the			d estimat	es should	l also be N	Ds!
* 1 1 1		(NDs), the			d estimat	es should	l also be N	Ds!
* 1 1 1 * 1 1 1	Warning: All observations are Non-Detects	(NDs), the	stics are also	NDs lyin	d estimat g below t	es should he larges	l also be N	Ds! limit!
* 1 1 1	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and o	(NDs), the	stics are also	NDs lyin	d estimat g below t	es should he larges	l also be N	Ds! limit!
* 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site	(NDs), the other stati	stics are also alues to estir	NDs lying mate envi	d estimat g below t ronmenta	es should he larges al parame	I also be N it detection iters (e.g.,	Ds! limit!
* 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and o	(NDs), the other stati	stics are also alues to estir	NDs lying mate envi	d estimat g below t ronmenta	es should he larges al parame	I also be N it detection iters (e.g.,	Ds! limit!
* 1 1 2 * 1 1 1 7 * 1 1 1 4 * 1 1 1 4	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site	(NDs), the other stati	stics are also alues to estir	NDs lying mate envi	d estimat g below t ronmenta	es should he larges al parame	I also be N it detection iters (e.g.,	Ds! limit!
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site	(NDs), the other stati	stics are also alues to estir	NDs lying mate envi	d estimat g below t ronmenta	es should he larges al parame	I also be N it detection iters (e.g.,	Ds! limit!
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KG B	(NDs), the other stati	stics are also alues to estir	NDs lying mate envi	d estimat g below t ronmenta	es should he larges al parame	I also be N it detection iters (e.g.,	Ds! limit!
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site	(NDs), the other stati	stics are also alues to estir	NDs lying mate envi	d estimat g below t ronmenta	es should he larges al parame	I also be N it detection iters (e.g.,	Ds! limit!
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KG B	(NDs), the other static specific v	stics are also alues to estir NZYL PHTHA	NDs lying mate envi	d estimat g below t ronmenta	es should he larges al parame	I also be N it detection iters (e.g.,	Ds! limit!
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KG B	(NDs), the other static specific v	stics are also alues to estir	NDs lying mate envi	d estimat g below t ronmenta so_ss) wa	es should he larges al parame as not pro	l also be N tt detection tters (e.g., ocessed!	Ds! limit! EPC, BTV)
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)	(NDs), the other static specific v BUTYL BE	stics are also alues to estir NZYL PHTHA	NDs lying mate envi	d estimat g below t ronmenta so_ss) wa	es should he larges al parame as not pro	I also be N it detection iters (e.g.,	Ds! limit! EPC, BTV)
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)	(NDs), the other static specific v BUTYL BE	stics are also alues to estir NZYL PHTHA	NDs lying mate envi	d estimate g below to ronmenta so_ss) was	es should he larges al parame as not pro	l also be N tt detection tters (e.g., ocessed!	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)	(NDs), the other static specific v SUTYL BE General	stics are also alues to estir NZYL PHTHA	NDs lying mate envi	d estimate g below to ronmenta so_ss) was	es should he larges al parame as not pro	l also be N tt detection ters (e.g., ocessed!	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)	(NDs), the other static specific v SUTYL BE General	stics are also alues to estir NZYL PHTHA	NDs lying mate envi	d estimate g below to ronmenta so_ss) was	es should he larges al parame as not pro	l also be N tt detection ters (e.g., ocessed!	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor	(NDs), the other static specific volume is specific	stics are also alues to estir NZYL PHTHA Statistics	NDs lying mate envi	d estimate g below to ronmenta so_ss) was umber of Numl	es should he larges al parame as not pro	l also be N tt detection ters (e.g., ocessed!	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This	(NDs), the other static specific v	stics are also ralues to estir  NZYL PHTHA  Statistics  only has 0 ob	NDs lying mate envi	d estimate g below to ronmenta so_ss) was umber of Numl	es should he larges al parame as not pro	l also be N tt detection sters (e.g., ocessed! bservation sing Value	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute	(NDs), the other static specific visually specif	stics are also ralues to estir  NZYL PHTHA  Statistics  only has 0 ob and meaning	NDS lyingmate envi	d estimate g below to ronmenta so_ss) was umber of Numl s!	es should he larges al parame as not pro	l also be Not detection sters (e.g., seessed!	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This	(NDs), the other static specific visually specif	stics are also ralues to estir  NZYL PHTHA  Statistics  only has 0 ob and meaning	NDS lyingmate envi	d estimate g below to ronmenta so_ss) was umber of Numl s!	es should he larges al parame as not pro	l also be Not detection sters (e.g., seessed!	Ds! Ilimit! EPC, BTV)
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	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site.  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute The data set for variable OS UC It is suggested to collect at least 8 to	(NDs), the other static specific visually specif	stics are also ralues to estir NZYL PHTHA Statistics only has 0 ob and meaning PROLACTAM vations befor	NDS lying mate envi  ALATE  (s  Nu  servation gful statist   (br_na)	d estimate g below to ronmenta so_ss) was umber of Numl s! cics and e was not p	es should he larges al parame as not pro  Distinct O per of Mis  estimates processed	l also be Not detection ters (e.g., beessed!  bservation sing Value	Ds! Ilimit! EPC, BTV)
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	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site.  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute The data set for variable OS UG/KG CAPROLACTAM   It is suggested to collect at least 8 to If possible, compute and collect Data Qual	(NDs), the other static specific visually specif	stics are also ralues to estir NZYL PHTHA Statistics only has 0 ob and meaning PROLACTAM vations befor	NDS lying mate envi  ALATE  (s  Nu  servation gful statist   (br_na)	d estimate g below to ronmenta so_ss) was umber of Numl s! cics and e was not p	es should he larges al parame as not pro  Distinct O per of Mis  estimates processed	l also be Not detection ters (e.g., beessed!  bservation sing Value	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site.  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute The data set for variable OS UC It is suggested to collect at least 8 to	(NDs), the other static specific visually specif	stics are also ralues to estir NZYL PHTHA Statistics only has 0 ob and meaning PROLACTAM vations befor	NDS lying mate envi  ALATE  (s  Nu  servation gful statist   (br_na)	d estimate g below to ronmenta so_ss) was umber of Numl s! cics and e was not p	es should he larges al parame as not pro	l also be Not detection ters (e.g., beessed!  bservation sing Value	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site.  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute The data set for variable OS UG/KG CAPROLACTAM   It is suggested to collect at least 8 to If possible, compute and collect Data Qual	(NDs), the other static specific value of the specific value of th	stics are also alues to estir NZYL PHTHA  Statistics  only has 0 ob and meaning PROLACTAM  vations befor ves (DQO) by	NDS lying mate envi  ALATE  (s  Nu  servation gful statist   (br_na)	d estimate g below to ronmenta so_ss) was umber of Numl s! cics and e was not p	es should he larges al parame as not pro	l also be Not detection ters (e.g., beessed!  bservation sing Value	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects (Specifically, sample mean, UCLs, UPLs, and of The Project Team may decide to use alternative site.  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute The data set for variable OS UC CE It is suggested to collect at least 8 to If possible, compute and collect Data Qualice OS UG/KG CAPROLACTAM  (so_sb)	(NDs), the other static specific value of the specific value of th	stics are also ralues to estir NZYL PHTHA Statistics only has 0 ob and meaning PROLACTAM vations befor	NDs lying mate envi	d estimate g below to ronmenta so_ss) was umber of Numi st tics and e was not p nese stat uple size	es should he larges al parame as not pro Distinct O per of Mis estimates processed istical me and analy	l also be Not detection ters (e.g., beessed!  bservation sing Value  ! thods! rtical result	Ds! Ilimit! EPC, BTV)
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	Warning: All observations are Non-Detects (Specifically, sample mean, UCLs, UPLs, and of The Project Team may decide to use alternative site.  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute The data set for variable OS UC CE It is suggested to collect at least 8 to If possible, compute and collect Data Qualice OS UG/KG CAPROLACTAM  (so_sb)	(NDs), the other static specific value of the specific value of th	stics are also alues to estir NZYL PHTHA  Statistics  only has 0 ob and meaning PROLACTAM  vations befor ves (DQO) by	NDs lying mate envi	d estimate g below to ronmenta so_ss) was umber of Numi st tics and e was not p nese stat uple size	es should he larges al parame as not pro	l also be Not detection ters (e.g., beessed!  bservation sing Value  ! thods! rtical result	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects (Specifically, sample mean, UCLs, UPLs, and of The Project Team may decide to use alternative site.  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute The data set for variable OS UC CE It is suggested to collect at least 8 to If possible, compute and collect Data Qualice OS UG/KG CAPROLACTAM  (so_sb)	General O N/A  data set of the reliable of the	stics are also alues to estir NZYL PHTHA  Statistics  only has 0 ob and meaning PROLACTAM  vations befor ves (DQO) by	NDs lying mate envi	d estimate g below to ronmenta so_ss) was umber of Numi st tics and e was not p nese stat uple size	es should he larges al parame as not pro	l also be Not detection ters (e.g., ocessed!  bservation sing Value  ! thods! rtical result	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects (Specifically, sample mean, UCLs, UPLs, and of The Project Team may decide to use alternative site.  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute The data set for variable OS UC CE It is suggested to collect at least 8 to If possible, compute and collect Data Qualice OS UG/KG CAPROLACTAM  (so_sb)	General O N/A  data set of the reliable of the	stics are also alues to estir NZYL PHTHA  Statistics  only has 0 ob and meaning PROLACTAM  vations befor ves (DQO) by	NDs lying mate envi	d estimate g below to ronmenta so_ss) was umber of Numi st tics and e was not p nese stat uple size	es should he larges al parame as not pro	l also be Not detection ters (e.g., ocessed!  bservation sing Value  ! thods! rtical result	Ds! Ilimit! EPC, BTV)
	Warning: All observations are Non-Detects (Specifically, sample mean, UCLs, UPLs, and of The Project Team may decide to use alternative site.  The data set for variable OS UG/KG B  OS UG/KG CAPROLACTAM  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute The data set for variable OS UC CE It is suggested to collect at least 8 to If possible, compute and collect Data Qualice OS UG/KG CAPROLACTAM  (so_sb)	General O N/A  data set of the reliable of the	stics are also alues to estir NZYL PHTHA  Statistics  only has 0 ob and meaning PROLACTAM  vations befor ves (DQO) by	NDs lying mate envi	d estimate g below to ronmenta so_ss) was umber of Numi st tics and e was not p nese stat uple size	es should he larges al parame as not pro	l also be Not detection ters (e.g., ocessed!  bservation sing Value  ! thods! rtical result	Ds! Ilimit! EPC, BTV

Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OSIUG/KGICAPROLACTAMI (so sb) was not processed! It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. OSJUG/KGJCAPROLACTAMJ (so ss) **General Statistics** Number of Valid Data 40 Number of Detected Data 0 Number of Distinct Detected Data 0 Number of Non-Detect Data 40 Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV) The data set for variable OS|UG/KG|CAPROLACTAM| (so ss) was not processed! OS|UG/KG|CARBAZOLE| (br\_na) General Statistics Total Number of Observations 0 Number of Distinct Observations 0 Tolerance Factor Number of Missing Values 30 N/A Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS|UG/KG|CARBAZOLE| (br\_na) was not processed! It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. OS|UG/KG|CARBAZOLE| (so\_sb) General Statistics Total Number of Observations 0 Number of Distinct Observations 0 Tolerance Factor Number of Missing Values 100 Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS|UG/KG|CARBAZOLE| (so\_sb) was not processed! It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. OS|UG/KG|CARBAZOLE| (so\_ss) **General Statistics** Number of Valid Data 40 Number of Detected Data 0 Number of Distinct Detected Data 0 Number of Non-Detect Data 40 Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV)

	У Г С В 1			
1 1 1	The data set for variable OS	UG/KG C/	ARBAZOLE  (so_ss) was not processed!	
1 1				
1 1	OS UG/KG CHRYSENE  (br_na)			
			Statistics	
	Total Number of Observations		Number of Distinct Observations	
	Tolerance Factor	N/A	Number of Missing Values	30
	Warning: This	s data set	only has 0 observations!	
			and meaningful statistics and estimates!	
, ,			HRYSENE  (br_na) was not processed!	
7 7				
1 1			vations before using these statistical methods!	
3 4	If possible, compute and collect Data Qua	lity Object	ives (DQO) based sample size and analytical results.	•
1 1				
	OS UG/KG CHRYSENE  (so_sb)			
			Statistics	
	Total Number of Observations		Number of Distinct Observations	
	Tolerance Factor	N/A	Number of Missing Values	100
	Warning: This	s data set	only has 0 observations!	
1 1 1		ite reliable	and meaningful statistics and estimates!	
1 1 1	Data set is too small to compu		and meaningful statistics and estimates! HRYSENE  (so_sb) was not processed!	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Data set is too small to compu The data set for variable OS It is suggested to collect at least 8 to	UG/KG C		•
2 1 1 2 2 3 4 0 2 3 4 1 2 3 4 3 2 4 3 2 4 3 2 4 4 4 2 3 4 4 4 4	Data set is too small to compu The data set for variable OS  It is suggested to collect at least 8 to If possible, compute and collect Data Qua	UG/KG C	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!	
	Data set is too small to compu The data set for variable OS It is suggested to collect at least 8 to	UG/KG C	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!	
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)	UG/KG C o 10 obser lity Object General	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics	
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data	UG/KG C o 10 obser lity Object General	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data	13
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data	O 10 obser o 10 obser lity Object General 40	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data	13 27
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor	General 40 11 1.69	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data	13 27
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data	General 40 11 1.69	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data	13 27
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor	General 40 11 1.69	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data	13 27
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to lf possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values	General 40 11 1.69	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected	13 27 67.50%
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected	General 40 11 1.69 75	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected	13 27 67.50% 3.989 4.942
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to lf possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected	General 40 11 1.69 75	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected	13 27 67.50% 3.989 4.942 4.286
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected	General 40 11 1.69 75 54 140 74.92 21.92	PRYSENE (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected	13 27 67.50% 3.989 4.942 4.286 0.243
	Data set is too small to compute and collect at least 8 to suggested to collect at least 8 to sible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	General 40 11 1.69 75 54 140 74.92 21.92 170	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	13 27 67.50% 3.989 4.942 4.286 0.243 5.136
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected	General 40 11 1.69 75 54 140 74.92 21.92 170	PRYSENE (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected	13 27 67.50% 3.989 4.942 4.286 0.243 5.136
	Data set is too small to compute and collect at least 8 to suggested to collect at least 8 to sible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	General 40 11 1.69 75 54 140 74.92 21.92 170	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	13 27 67.50% 3.989 4.942 4.286 0.243 5.136
	Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect	General 40 11 1.69 75 54 140 74.92 21.92 170 310	PRYSENE (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario	13 27 67.50% 3.989 4.942 4.286 0.243 5.136 5.737
	Data set is too small to compute The data set for variable OS  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Maximum Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits  Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods)	General 40 11 1.69 75 54 140 74.92 21.92 170 310	PRYSENE (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL	13 27 67.50% 3.989 4.942 4.286 0.243 5.136 5.737
	Data set is too small to compute and collect at least 8 to suggested to collect at least 8 to suggested to collect at least 8 to suggested to collect Data Quade If possible, compute and collect Data Quade If possible, compute and collect Data Quade If possible, compute and collect Data Quade If possible, compute and collect Data Quade If possible, compute and collect Data Quade If possible, compute and collect Data Quade If possible, compute and collect Data Quade If possible, compute and collect Data Quade If possible, compute and collect Data Statistics If possible If possi	General 40 11 1.69 75 54 140 74.92 21.92 170 310	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL	13 27 67.50% 3.989 4.942 4.286 0.243 5.136 5.737
	Data set is too small to compute and set for variable OS  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs	General 40 11 1.69 75 54 140 74.92 21.92 170 310 recomments),	PRYSENE (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage	13 27 67.50% 3.989 4.942 4.286 0.243 5.136 5.737
	Data set is too small to compute The data set for variable OS  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Maximum Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits  Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs	General 40 11 1.69 75 54 140 74.92 21.92 170 310  Backgrour	HRYSENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Single DL Non-Detect Percentage	13 27 67.50% 3.989 4.942 4.286 0.243 5.136 5.737 40 0
	Data set is too small to compute The data set for variable OS  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Maximum Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs	General 40 11 1.69 75 54 140 74.92 21.92 170 310  Backgrour Only	Vations before using these statistical methods!  Ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  d Statistics Lognormal Distribution Test with Detected Value	13 27 67.50% 3.989 4.942 4.286 0.243 5.136 5.737 40 0 100.00°
	Data set is too small to compute The data set for variable OS  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Mean of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic	General 40 11 1.69 75 54 140 74.92 21.92 170 310 recomments),	Vations before using these statistical methods!  Ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  d Statistics  Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic	13 27 67.50% 3.989 4.942 4.286 0.243 5.136 5.737 40 0 100.00 s Only 0.861
	Data set is too small to compute The data set for variable OS  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Maximum Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs	General 40 11 1.69 75 54 140 74.92 21.92 170 310 recommens),	Vations before using these statistical methods!  Ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  d Statistics Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	13 27 67.50% 3.989 4.942 4.286 0.243 5.136 5.737 40 0 100.00 9.861 0.866
	Data set is too small to compute The data set for variable OS  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG CHRYSENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Note: Data have multiple DLs - Use of KM Method is For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	General 40 11 1.69 75 54 140 74.92 21.92 170 310 recommens),	Vations before using these statistical methods!  Ives (DQO) based sample size and analytical results.  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  d Statistics  Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic	13 27 67.50% 3.989 4.942 4.286 0.243 5.136 5.737 40 0 100.00° s Only 0.861 0.866

	у в с в з		0 R I I E	,
	DL/2 Substitution Method		DL/2 Substitution Method	
1 1 1	Mean		Mean (Log Scale)	4 642
1 1 1		27.8	SD (Log Scale)	
1 1 4	95% UTL 90% Coverage		95% UTL 90% Coverage	
1 1 1	95% UPL (t)		95% UPL (t)	
1 1 1	95% OPE (t) 90% Percentile (z)		95% OPL (t) 90% Percentile (z)	
3 3 0			( )	
	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)	1/2.5	99% Percentile (z)	206.4
	Maximum Likalihaad Estimata/MLE\ Mathad	NI/A	Laz DOS Mathad	
	Maximum Likelihood Estimate(MLE) Method	IN/A	Log ROS Method	74.00
			Mean in Original Scale	
			SD in Original Scale	
			Mean in Log Scale	
			SD in Log Scale	
			95% UTL 90% Coverage	
			95% UPL (t)	
' '			90% Percentile (z)	
			95% Percentile (z)	
			99% Percentile (z)	112.8
, ;				
	Gamma Distribution Test with Detected Values		Data Distribution Test with Detected Values (	
	k star (bias corrected)		Data follow Appr. Gamma Distribution at 5% Signification	ance Le
	Theta Star			r
	nu star	330.8		
	A-D Test Statistic		Nonparametric Statistics	ı
	5% A-D Critical Value		Kaplan-Meier (KM) Method	
	K-S Test Statistic		Mean	
	5% K-S Critical Value			21.06
	pata follow Appx. Gamma Distribution at 5% Signific	ance Leve		
			95% KM UTL with 90% Coverage	
	Assuming Gamma Distribution		95% KM Chebyshev UPL	
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
	Mean		90% Percentile (z)	101.9
7 * 1	Median	77.7	95% Percentile (z)	109.6
	SD	15.35	99% Percentile (z)	123.9
	k star	25.89		
	Theta star	2.932	Gamma ROS Limits with Extrapolated Dat	
	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	
	95% Percentile of Chisquare (2k)	69.58	95% Hawkins Wixley (HW) Approx. Gamma UPL	
			95% WH Approx. Gamma UTL with 90% Coverage	102.1
	90% Percentile	95.56	95% HW Approx. Gamma UTL with 90% Coverage	102.2
	95% Percentile	102		
1 1 4	99% Percentile	114.9		
	Note: DL/2 is not a recommended method.			
	OS UG/KG DIBENZO(A,H)ANTHRACENE  (br_na)			
1 1 1		General	Statistics	
, , ,	Total Number of Observations		Number of Distinct Observations	
	Tolerance Factor	N/A	Number of Missing Values	30
1 1 4	1		only has 0 shaanstianal	
1 3 4 1 3 4 1 3 8	Warning: This			
	Data set is too small to compu	ıte reliable	and meaningful statistics and estimates!  A,H)ANTHRACENE  (br_na) was not processed!	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Data set is too small to compu The data set for variable OS UG/KG D It is suggested to collect at least 8 to	ite reliable DIBENZO( o 10 obsei	and meaningful statistics and estimates!  A,H)ANTHRACENE  (br_na) was not processed!  vations before using these statistical methods!	
	Data set is too small to compu The data set for variable OS UG/KG D It is suggested to collect at least 8 to	ite reliable DIBENZO( o 10 obsei	and meaningful statistics and estimates! A,H)ANTHRACENE  (br_na) was not processed!	
	Data set is too small to compu The data set for variable OS UG/KG D It is suggested to collect at least 8 to	ite reliable DIBENZO( o 10 obsei	and meaningful statistics and estimates!  A,H)ANTHRACENE  (br_na) was not processed!  vations before using these statistical methods!	S.

	У С		h	q			1	·	r
* 1 1 1	OS UG/KG DIBENZO(A,H)ANTHRACEN	El (so_sb)			L.				
* 1 1 *									
4 1 1 4			General	Statistics					
4 1 4 0	Total Number of Ob	servations	0		N	Number of	Distinct Ob	servations	0
4 1 4 1	Tolerar	nce Factor	N/A			Num	ber of Miss	ing Values	100
4 3 4 3				1					
4 1 4 1									
4 1 4 4	Wa	rnina: This	s data set	only has 0	observatio	ns!			
* 1 * 1	Data set is too smal						estimates!		
* 1 * *	The data set for variable OS							essed!	
4 1 4 1		,		-,-,-		(			
* 1 * *	It is suggested to collect a	at least 8 to	o 10 obser	vations be	fore usina	these stat	istical met	nods!	
4 1 4 4	If possible, compute and collect								
4 7 4 6	, ,	·		•	<u> </u>	•	·		
4 1 4 1									
4 1 4 1	OS UG/KG DIBENZO(A,H)ANTHRACEN	El (so ss)							
* 1 * *	( , , ,								
* 1 * 1			General	Statistics					
	Number of	Valid Data				Num	ber of Dete	ected Data	0
4 1 4 7	Number of Distinct Dete	ected Data	0					etect Data	
* 7 * *			1	l .					
* 1 * *	Warning: All observations are No	n-Detects	(NDs). the	refore all s	tatistics a	nd estimat	es should a	also be ND	s!
* 1 * *	Specifically, sample mean, UCLs, U								
* 1 * 1	The Project Team may decide to use alte								
4 1 4 1	•		•				•		
* 1 * 1	The data set for variable Os	SJUG/KGIE	DIBENZO(	A,H)ANTH	RACENEI	(so ss) w	as not prod	essed!	
* 1 * *			•		·	`	<u> </u>		
* 1 * 1									
* 1 * 1	OS UG/KG DIBENZOFURAN  (br_na)								
* 1 * *									
* 1 * *			General	Statistics					
4 1 1 0	Total Number of Ob	servations	0		١	lumber of	Distinct Ob	servations	0
4 3 3 1	Tolerar	nce Factor	N/A			Num	ber of Miss	ing Values	30
4 1 1 1									
4 1 1 1									
4 7 2 4	Wa	rning: This	s data set	only has 0	observatio	ns!			
4 1 7 4	Data set is too smal	I to compu	ıte reliable	and mean	ingful stati	stics and e	estimates!		
4 3 3 4	The data set for varia	ble OS U	G/KG DIBE	NZOFUR/	AN  (br_na	) was not	processed	!	
4 3 3 3									
4 1 3 8	It is suggested to collect a								
4 1 3 4	If possible, compute and collect	Data Qua	lity Object	ives (DQO)	) based sa	mple size	and analyt	ical results	
* 1 * 1	OS UG/KG DIBENZOFURAN  (so_sb)								
				Statistics					
	Total Number of Ob				١			servations	
* 1 1 1	Tolerar	nce Factor	N/A			Num	ber of Miss	ing Values	100
* 1 * *									
				only has 0					
* 1 * 1	Data set is too small								
	The data set for varia	ble OS U0	G/KG DIBE	NZOFUR	AN  (so_st	) was not	processed	!	
* 1 * 1									
	It is suggested to collect a								
	If possible, compute and collect	Data Qua	lity Object	ives (DQO)	) based sa	mple size	and analyt	ical results	
* 1 * 1									
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	OS UG/KG DIBENZOFURAN  (so_ss)								

	*	,	c	В			e e			1	r	r
					L.	General	Statistics		L.	•		
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* * * 1		N	umber of D							er of Non-Dete		
* * * *						-						
* * * *	W	/arning: Al	l observation	ns are No	n-Detects	(NDs), the	erefore all s	tatistics ar	nd estimat	es should als	o be ND	s!
										he largest de		
4 4 9 1										al parameters		
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			The data e	et for varis	hle OSILI	2/KGIDIBI	NZOFUR	ANI (en ee	) was not	processed!		
* * 1 *			THE data s	et ioi valie		וטוטן	-14201 010	-114] (30_33	y was not	processeur		
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* * 1 1												
* * 1 1	OSILIG/K	CIDIETUV	L PHTHAL	ATEL/br	201							
	Coloani	арыстт		VIEI (DI_	ia <i>)</i>							
* * * *						General	Statistics					
* * * *			Total Nun	nhar of ∩h	servations		Statistics		lumber of	Distinct Obse	ryations	n
* * 1 1			i Otal INUI		nce Factor	N/A		,,		ber of Missing		
				TOIETAI	ice Facioi	IN/A			Nulli	bei oi iviissiiig	values	30
* *												
* 1 1 0				187-	uning: Thi	a date ast	anhi kaa A	ahaan isti -	nal			
* * 3 1			Date				only has 0					
* * 1 1		<del></del> -					and mean					
* * 1 1 1		ın	e data set	for variable	e OSJUG/R	GDETH	YL PH I HA	LAIE (br_	na) was n	ot processed	ļ	
* 1 1 1		1		4 0		- 40 '		· ·	al	lasta at 111	1-1	
										istical method		
	l	f possible,	, compute a	and collect	Data Qua	lity Object	ives (DQO	) based sa	mple size	and analytica	il results.	
. , , ,												
* * 3 1												
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* * 1 *	OS UG/K	GIDIETHY	L PHTHAL	ATE  (so_	sb)							
* * 1 0												
* * 1 1							Statistics					
* * 1 1			Total Nun	nber of Ob	servations	0		N	lumber of	Distinct Obse	rvations	0
* * 1 1				Tolera	nce Factor	N/A			Numl	ber of Missing	Values 1	100
* * 1 1						•	•				•	
* * 1 1												
* * 1 *				Wa	rning: This	s data set	only has 0	observatio	ns!			
* * 1 1			Data set i	s too sma	ll to compu	ıte reliable	and mean	ingful stati	stics and e	estimates!		
* * 1 *		Th	e data set 1	or variable	OSJUG/k	(G DIETH	YL PHTHA	LATE  (so_	_sb) was n	ot processed	!!	
* * 1 *										•		
		It is	suggested	to collect	at least 8 t	o 10 obsei	vations be	fore using	these stat	istical method	ds!	
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	OSIUG/K	GIDIETHY	L PHTHAL	ATEI (so	ss)							
				-1 (	-,							
* * * 1						General	Statistics					
			N	Number of	Valid Data				Num	ber of Detect	ed Data	0
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		- 11			a Dula	1-	1		. 1011100	0	J. Data	. •
* * * 1	١٨.	/arning: Al	l observation	ns are No	n-Detecte	(NDe) the	refore all c	tatistice e	nd estimet	es should als	o he ND	sl
* * * 1										he largest de		
* * 1 1										al parameters		
* * * *	THE FIUJE	CL I Calli III	ay ueciue i	use aile	inauve Sile	s ahacilic /	raiues IU E	sumate em	vii Oriillierik	ai parameters	, ( <del>c</del> .y., ⊏	· U, DIV).
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* * * 3												
			n.a. =									
	osjug/K	GIDIMETH	IYL PHTHA	NLATE  (br	_na)							
							Statistics					
* * * 1			Total Nun		servations	-		N		Distinct Obse		-
* * * 1				Tolera	nce Factor	N/A			Numl	ber of Missing	y Values	30
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	y r c D 1		0						
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \								
	Warning: This								
	Data set is too small to compu								
	The data set for variable OS UG/K0	GIDIMETH	IYL PHTHAL	ATE  (br_	na) was	not proce	essed!		
	It is suggested to collect at least 8 to	10 obser	vations before	re using th	hese stat	tistical me	ethods!		
	If possible, compute and collect Data Qual	ity Objecti	ives (DQO) b	ased sam	nple size	and anal	ytical res	ults.	
* * 1 *	OS UG/KG DIMETHYL PHTHALATE  (so_sb)								
4 4 1 1		General	Statistics						
* * : *	Total Number of Observations		Otatiotics	Nı	ımber of	Distinct (	Observation	ne O	
* * 1 *	Tolerance Factor	N/A		140					00
	Tolerance Factor	IN/A			inuiii	Dei Oi Wils	ssing Valu	ies it	00
	Warning: This								
	Data set is too small to compu								
	The data set for variable OS UG/KG	3 DIMETH	IYL PHTHAL	ATE  (so_	sb) was	not proce	essed!		
	It is suggested to collect at least 8 to	10 obser	vations before	re using th	nese stat	istical me	ethods!		
	If possible, compute and collect Data Qual	ity Objecti	ives (DQO) b	ased sam	nple size	and anal	ytical res	ults.	
	OS UG/KG DIMETHYL PHTHALATE  (so_ss)								
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		Conorol	Ctatiatics						
	Number of Volid Date		Statistics		Nicon	ahar of D	atastad D	oto 0	
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	Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and	40 0 (NDs), the	erefore all sta	NDs lyin	Number d estimat g below t	er of Non- tes should the larges	-Detect D d also be st detection	Ata 40 NDs!	0 hit!
	Number of Distinct Detected Data  Warning: All observations are Non-Detects	40 0 (NDs), the	erefore all sta	NDs lyin	Number d estimat g below t	er of Non- tes should the larges	-Detect D d also be st detection	Ata 40 NDs!	0 hit!
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Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OSIUG/KGIDI-N-BUTYL PHTHALATEI (so sb) was not processed! It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. OS|UG/KG|DI-N-BUTYL PHTHALATE| (so ss) General Statistics Number of Valid Data 40 Number of Detected Data 0 Number of Distinct Detected Data 0 Number of Non-Detect Data 40 Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV) The data set for variable OS|UG/KG|DI-N-BUTYL PHTHALATE| (so\_ss) was not processed! OS|UG/KG|DI-N-OCTYL PHTHALATE| (br\_na) General Statistics Total Number of Observations 0 Number of Distinct Observations 0 Tolerance Factor Number of Missing Values 30 N/A Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS|UG/KG|DI-N-OCTYL PHTHALATE| (br\_na) was not processed! It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. OS|UG/KG|DI-N-OCTYL PHTHALATE| (so\_sb) General Statistics Total Number of Observations 0 Number of Distinct Observations 0 Tolerance Factor Number of Missing Values 100 Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS|UG/KG|DI-N-OCTYL PHTHALATE| (so\_sb) was not processed! It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. OS|UG/KG|DI-N-OCTYL PHTHALATE| (so\_ss) **General Statistics** Number of Valid Data 40 Number of Detected Data 0 Number of Distinct Detected Data 0 Number of Non-Detect Data 40 Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV)

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	The data set for variable OS UG/KG	IDI-N-OC	TYL PHTHALATE  (so_ss) was not processed!	
# 1	OS UG/KG FLUORANTHENE  (br_na)			
			Statistics	_
	Total Number of Observations		Number of Distinct Observations	
	Tolerance Factor	N/A	Number of Missing Values	30
	Warning: This	s data set	only has 0 observations!	
• •			and meaningful statistics and estimates!	
* *	The data set for variable OS UC	3/KG FLU	ORANTHENE  (br_na) was not processed!	
	It is suggested to collect at least 9 to	o 10 obsou	vations before using these statistical methods!	
			ives (DQO) based sample size and analytical results	_
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1 1				
	OS UG/KG FLUORANTHENE  (so_sb)			
		General	Statistics	
	Total Number of Observations		Number of Distinct Observations	0
1 1	Tolerance Factor	N/A	Number of Missing Values	
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4 3 0	Data set is too small to compu	ite reliable	and meaningful statistics and estimates!	
e 3 a	Data set is too small to compu	ite reliable		
e 2 2 4 e 5 5 e	Data set is too small to compu The data set for variable OS UC	ite reliable 3/KG FLU	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!	
e 3 4	Data set is too small to compu The data set for variable OS UC It is suggested to collect at least 8 to	ite reliable G/KG FLU0 o 10 obsei	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!	
e 3 e e 3 e	Data set is too small to compu The data set for variable OS UC It is suggested to collect at least 8 to	ite reliable G/KG FLU0 o 10 obsei	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!	•
e 3 e e 3 e	Data set is too small to compu The data set for variable OS UC It is suggested to collect at least 8 to	ite reliable G/KG FLU0 o 10 obsei	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!	
7 3 7 7 7 3 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qua	ite reliable G/KG FLU0 o 10 obsei	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!	
	Data set is too small to compu The data set for variable OS UC It is suggested to collect at least 8 to	ite reliable G/KG FLU0 o 10 obsei	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!	
	Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qua	ite reliable G/KG FLUG o 10 obsei lity Object	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results	
	Data set is too small to compute the data set for variable OS UG   It is suggested to collect at least 8 to lift possible, compute and collect Data Qua  OS UG/KG FLUORANTHENE  (so_ss)	ite reliable G/KG FLUG o 10 obsei lity Object General	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics	
	Data set is too small to compute The data set for variable OS UG  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG FLUORANTHENE  (so_ss)  Number of Valid Data	te reliable G/KG FLUG 0 10 obset lity Object  General	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data	31
3 1 3 3 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Data set is too small to compute The data set for variable OS UG  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG FLUORANTHENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data	te reliable G/KG FLUG 0 10 obset lity Object  General 40 24	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data  Number of Non-Detect Data	31
	Data set is too small to compute The data set for variable OS UG  It is suggested to collect at least 8 to lif possible, compute and collect Data Qua  OS UG/KG FLUORANTHENE  (so_ss)  Number of Valid Data	control of the contro	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data	31
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	control of the contro	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects	31
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics	31 9 22.50%
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected	31 9 22.50%
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected	31 9 22.50% 4.025 5.438
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected	31 9 22.50% 4.025 5.438 4.482
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected	31 9 22.50% 4.025 5.438 4.482 0.349
	Data set is too small to compute The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG FLUORANTHENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected	General 40 24 1.69 75 56 230 94.24 38.11 170	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected	31 9 22.50% 4.025 5.438 4.482 0.349 5.136
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75 56 230 94.24 38.11 170	And meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  Vations before using these statistical methods!  Ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect	31 9 22.50% 4.025 5.438 4.482 0.349 5.136
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75 56 230 94.24 38.11 170 260	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario	31 9 22.50% 4.025 5.438 4.482 0.349 5.136 5.561
	Data set is too small to compute The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG FLUORANTHENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is	General 40 24 1.69 75 56 230 94.24 38.11 170 260	And meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  Vations before using these statistical methods!  Ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL	31 9 22.50% 4.025 5.438 4.482 0.349 5.136 5.561
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75 56 230 94.24 38.11 170 260	And meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Minimum Non-De	31 9 22.50% 4.025 5.438 4.482 0.349 5.136 5.561
	Data set is too small to compute The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  OS UG/KG FLUORANTHENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Data with Multiple Detection Limits Note: Data have multiple DLs - Use of KM Method is	General 40 24 1.69 75 56 230 94.24 38.11 170 260	And meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  Vations before using these statistical methods!  Ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL	31 9 22.50% 4.025 5.438 4.482 0.349 5.136 5.561
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75 56 230 94.24 38.11 170 260	And meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Minimum Non-De	31 9 22.50% 4.025 5.438 4.482 0.349 5.136 5.561
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75 56 230 94.24 38.11 170 260  Backgrour Only	and meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  d Statistics  Lognormal Distribution Test with Detected Value	31 9 22.50% 4.025 5.438 4.482 0.349 5.136 5.561 40 0 100.00°
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75 56 230 94.24 38.11 170 260  Backgrour Only 0.833	And meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  dd Statistics  Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic	31 9 22.50% 4.025 5.438 4.482 0.349 5.136 5.561 40 0 100.000
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75 56 230 94.24 38.11 170 260  Backgrour Only 0.833 0.929	And meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  d Statistics  Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	31 9 22.50% 4.025 5.438 4.482 0.349 5.136 5.561 40 0 100.00 s Only 0.931 0.929
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75 56 230 94.24 38.11 170 260  Backgrour Only 0.833 0.929	And meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  dd Statistics  Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic	31 9 22.50% 4.025 5.438 4.482 0.349 5.136 5.561 40 0 100.00 s Only 0.931 0.929
	Data set is too small to compute The data set for variable OS UG UG UG UG UG UG UG UG UG UG UG UG UG	General 40 24 1.69 75 56 230 94.24 38.11 170 260  Backgrour Only 0.833 0.929	And meaningful statistics and estimates!  DRANTHENE  (so_sb) was not processed!  vations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data Percent Non-Detects  Log-transformed Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Minimum Non-Detect Maximum Non-Detect Maximum Non-Detect Single Detection Limit Scenario Number treated as Non-Detect with Single DL Number treated as Detected with Single DL Single DL Non-Detect Percentage  d Statistics  Lognormal Distribution Test with Detected Value Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	31 9 22.50% 4.025 5.438 4.482 0.349 5.136 5.561 40 0 100.00 s Only 0.931 0.929

DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage		DL/2 Substitution Method Mean (Log Scale)	
Mean SD	99.91	Mean (Log Scale)	
SD			
	JJ. / I		U 336
		SD (Log Scale) 95% UTL 90% Coverage	
95% UPL (t)		95% UPL (t)	
95% OPL (t) 90% Percentile (z)		95% OPE (t) 90% Percentile (z)	
. ,		` '	
95% Percentile (z)		95% Percentile (z)	
99% Percentile (z)	183	99% Percentile (z)	206.5
Maying up Likelihaad Fatimata (MLF) Mathad	NI/A	Law DOC Mathad	
Maximum Likelinood Estimate(MLE) Method	N/A		00.00
		99% Percentile (z)	185.1
, ,		Data follow Appr. Gamma Distribution at 5% Significa	ance Lev
			ı
nu star	446.7		
		•	ı
			36.54
Data follow Appx. Gamma Distribution at 5% Signific	ance Leve		
		90% Percentile (z)	140.5
Median	91	95% Percentile (z)	153.7
SD	34.43	99% Percentile (z)	178.6
k star	8.808		
Theta star	10.79		
		95% Wilson Hilferty (WH) Approx. Gamma UPL	154
95% Percentile of Chisquare (2k)	28.38		
		95% WH Approx. Gamma UTL with 90% Coverage	153.3
90% Percentile	137.7	95% HW Approx. Gamma UTL with 90% Coverage	153.6
95% Percentile	153.1		
99% Percentile	184.9		
Note: DL/2 is not a recommended method.			
OSILIG/KGIELLIORENEL/hr. na)			
	General	Statistics	
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Data set is too small to compu	ıte reliable	and meaningful statistics and estimates!	
		rvations before using these statistical methods! ives (DQO) based sample size and analytical results	<b>5.</b>
pooline, compare and concer sate qual	, - 2,000	() 2000 Campio and analysisal rootile	-
	Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)  90% Percentile 95% Percentile 95% Percentile 95% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG FLUORENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS  It is suggested to collect at least 8 to	Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data  Mean 95.03  Median 91  SD 34.43  k star 8.808  Theta star 10.79  Nu star 704.6  95% Percentile of Chisquare (2k) 28.38  90% Percentile 137.7  95% Percentile 153.1  99% Percentile 184.9  Note: DL/2 is not a recommended method.  OS UG/KG FLUORENE  (br_na)  General  Total Number of Observations 0  Tolerance Factor N/A  Warning: This data set  Data set is too small to compute reliable  The data set for variable OS UG/KG F	Mean in Original Scale SD in Original Scale SD in Log Scale 95% UPL 10) 95% Percentile (2) 95% UPL 10)

	Y 1 C 1	h	e			1		,
4 1 1 1	OS UG/KG FLUORENE  (so_sb)							<u> </u>
4 1 2 2	,							
4 1 1 1		General	Statistics					
4 3 3 4	Total Number of Observations	0		N	lumber of	Distinct Ob	servations	0
4 1 3 4	Tolerance Factor	N/A			Num	ber of Miss	ing Values	100
4 7 3 4								•
4 1 1 1								
* 1 1 *	Warning: This							
4 1 1 4	Data set is too small to compu							
	The data set for variable OS	UG/KG F	LUORENE	(so_sb) w	as not pro	ocessed!		
* 1 1 1		- 40			u			
* 1 1 1	It is suggested to collect at least 8 to							
4 7 1 4	If possible, compute and collect Data Qual	illy Object	ves (DQO	) Daseu sai	Tiple Size	and analyt	icai result	<b>5.</b>
4 1 1 4								
4 1 1 4								
4 7 1 1	OS UG/KG FLUORENE  (so_ss)							
* 1 1 *	( <u>-</u>							
4 3 3 4		General	Statistics					
4 7 4 6	Number of Valid Data	40			Nun	nber of Dete	ected Data	0
* 1 * 1	Number of Distinct Detected Data	0			Numbe	er of Non-D	etect Data	40
* 1 * 1								
4 3 4 1	Warning: All observations are Non-Detects							
* 3 * *	Specifically, sample mean, UCLs, UPLs, and							
	The Project Team may decide to use alternative site	specific v	alues to es	stimate env	rironment	al paramet	<u>ers (e.g., F</u>	EPC, BTV)
* 1 * 1				., .				
* 1 * *	The data set for variable OS	UG/KG F	LUORENE	(so_ss) w	as not pro	ocessed!		
4 1 4 4								
* 1 * *								
* 1 * 1	OS UG/KG HEXACHLOROBENZENE  (br_na)							
4 7 4 3								
4 7 4 1		General	Statistics					
4 7 4 4	Total Number of Observations	0		N	lumber of	Distinct Ob	servations	0
4 2 4 4	Tolerance Factor	N/A			Num	ber of Miss	ing Values	30
4 3 4 4								
4 1 4 1								
	Warning: This							
	Data set is too small to compu							
	The data set for variable OS UG/KG	HEXACE	ILOROBE	NZENE  (bi	_na) was	not proces	ised!	
4 1 4 1	lt is accorded to collect at least 0 to	. 10 abaa		fana walaa i			andal .	
* 1 * 1	It is suggested to collect at least 8 to If possible, compute and collect Data Qual							
4 1 4 4	ii possible, compute and collect Data Quai	iity Object	ves (DQO)	Daseu sai	libie size	anu anaiyi	icai results	<b>)</b> ,
4 7 4 8							-	
e 3 e e								
* 1 * 1	OS UG/KG HEXACHLOROBENZENE  (so_sb)							
* 1 * *	, , , , , , , , , , , , , , , , , , , ,							
* 1 * *		General	Statistics					
* 1 1 *	Total Number of Observations	0		N	lumber of	Distinct Ob	servations	0
4 3 3 1	Tolerance Factor	N/A			Num	ber of Miss	ing Values	100
4 7 7 7								
4 3 3 9								
* 1 1 *	Warning: This							
* 1 1 *	Data set is too small to compu							
* 1 1 1	The data set for variable OS UG/KG	IHEXACH	ILOROBE	NZENE  (so	_sb) was	not proces	sed!	
* 1 1 *	la la companyata de collecte de la c	40	nadar - t	faua!	·	dadaal : *		
4 7 7 6	It is suggested to collect at least 8 to							
4 7 4 6	If possible, compute and collect Data Qual	iity Object	ves (DQO)	pased sal	npie size	anu anaiyt	icai results	<b>&gt;.</b>
* 1 * 1								
4 1 4 1								
f 1 f 1	OS UG/KG HEXACHLOROBENZENE  (so_ss)							
4 7 4 4								

	Y	,	c	D		h	e			1	*	r
* 1 * *			· · · · · · · · · · · · · · · · · · ·			General	Statistics					
* 1 * *			Nι	ımber of	Valid Data	40			Num	ber of Dete	ected Data	0
* 1 * 1		Nι	umber of Dis	tinct Dete	ected Data	0			Numbe	er of Non-D	etect Data	40
* 1 * *												
			observation									
* 1 * *			ample mean									
* 1 * 1	The Project	Team ma	ay decide to	use alte	rnative site	e specific v	alues to e	stimate en	vironmenta	al paramete	ers (e.g., E	PC, BTV).
4 1 4 1					001110111				```			
4 2 0 4		Ine	data set for	variable	OSJUG/KG	IHEXACE	ILOROBEI	NZENE  (S	o_ss) was	not proces	ssea!	
* 1 * *												
* 1 * *	<del> </del>											
4 1 4 1	osjug/kgji	HEXACL	H OROCYC	I OPENT	ADIENEL	(hr na)						
* 1 * *	OO OG#RG	120101	120110010	LOI LIVI	, (DILITE)	(DI_IIU)						
* 1 * *						General	Statistics					
			Total Numb	per of Ob	servations	0		N	lumber of	Distinct Ob	servations	0
* * * 1		-		Tolera	nce Factor	N/A			Numl	ber of Miss	ing Values	30
4 8 9 3												
4 8 9 3												
* * * *							only has 0					
* * * *			Data set is								<u> </u>	
	Th	ne data s	set for variat	ole OS U	G/KG HEX	ACHLOR	OCYCLOP	ENTADIEN	VE  (br_na	) was not p	processed!	
* * * 1												
			suggested to									
	lf p	ossible,	compute an	d collect	Data Qua	lity Object	ives (DQO	) based sa	mple size	and analyt	ical results	
* * 1 1												
4 8 1 2		UEVACI	II ODOOVO	LODENI	ADIENEL	(aa ab)						
* * 1 *	osjug/kgji	TEXACE	ILURUCTU	LOPENI	ADIENE	(80_80)						
* * 1 *						General	Statistics					
* * * *			Total Numb	ner of Oh	servations		Gialistics		lumber of	Distinct Ob	servations	n
* * 1 1			Totalitanii		nce Factor	N/A				ber of Miss		
* * * *						1	-					
* * * *												
4 8 3 0				Wa	rning: This	s data set	only has 0	observatio	ns!			
* * 1 1			Data set is									
* * 1 1	Th	ne data s	et for variab	le OS U	G/KG HEX	ACHLOR	OCYCLOP	ENTADIEN	(so_sb	) was not p	processed!	
* * 1 1												
* * 1 *			suggested to									
* * 1 *	lf p	ossible,	compute an	d collect	Data Qua	lity Object	ives (DQO	) based sa	mple size	and analyt	ical results	·.
4 4 3 3												
4 X 2 X	1											
* * 1 *	OSIUG/KGII	HEXACL	II OROCYC	I OPENT	ADIENEL	(20 92)						
* * 1 *	Jogodinaji	,	0.10010			(55_55)						
4 8 1 1						General	Statistics					
4 1 1 1			Nι	ımber of	Valid Data				Num	ber of Dete	ected Data	0
4 1 1 1		Nı	umber of Dis	tinct Dete	ected Data	0			Numbe	er of Non-D	etect Data	40
4 8 3 4												
* * 1 *			observation									
e # 1 e			ample mean									
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	Number of Distinct Detected Data  Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KC  OS UG/KG HIGH MOLECULAR WEIGHT PAHS  (but to be a set of the part of	(NDs), the other static specific variation of the static specific variation of the static specific variation of the reliable o	erefore all sistics are als values to es HLOROETH  Statistics  only has 0 of and meanicular WEI  vations befores (DQO)	oo NDs lyir timate env HANE  (so_ N observation ngful statis GHT PAHS ore using t based san	Number of Num  Number of Num  Num  Num  Num  Num  Num  Num  Num	er of Non- tes should the larges al parame not proce  Distinct Cober of Mis estimates ) was not tistical me and anal	d also be st detection deters (e.g. detection	ns 0 es 30 dl
	Number of Distinct Detected Data  Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KC  OS UG/KG HIGH MOLECULAR WEIGHT PAHS  (but the companies of the co	(NDs), the other static specific variation of the static specific variation of the static specific variation of the reliable o	erefore all sistics are als values to es HLOROETH  Statistics  only has 0 of and meanicular WEI  vations befores (DQO)	oo NDs lyir timate env HANE  (so_ N observation ngful statis GHT PAHS ore using t based san	Number of Num  Number of Num  Num  Num  Num  Num  Num  Num  Num	er of Non- tes should the larges al parame not proce  Distinct Cober of Mis estimates ) was not tistical me and anal	d also be st detection deters (e.g. essed!  Description of the state o	ns 0 es 30 dl
	Number of Distinct Detected Data  Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KC  OS UG/KG HIGH MOLECULAR WEIGHT PAHS  (but the companies of the co	(NDs), the other static specific variation of the static specific variation of the static specific variation of the reliable o	erefore all sistics are als values to es HLOROETH  Statistics  only has 0 of and meanicular WEI  vations befores (DQO)	oo NDs lyir timate env HANE  (so_ N observation ngful statis GHT PAHS ore using t based san	Number of Num  Number of Num  Num  Num  Num  Num  Num  Num  Num	er of Non- tes should the larges al parame not proce  Distinct Cober of Mis estimates ) was not tistical me and anal	d also be st detection deters (e.g. detection	ns 0 es 30 dl
	Number of Distinct Detected Data  Warning: All observations are Non-Detects ( Specifically, sample mean, UCLs, UPLs, and of the Project Team may decide to use alternative site  The data set for variable OS UG/KC  OS UG/KG HIGH MOLECULAR WEIGHT PAHS  (but the companies of the co	(NDs), the other static specific variation of the specific variation of the reliable of the re	Statistics  Only has 0 of and meanicular West (DQO)  Statistics	oo NDs lyir timate env HANE  (so_ N observation ngful statis GHT PAHS ore using t based san	d estimating below ironments.  ss) was  umber of Num  ns! etics and of Si (br_na) hese state in the size in the si	er of Non- tes should the larges al parame not proce  Distinct Cober of Mis estimates ) was not tistical me and anal	d also be st detection deters (e.g. detection	ns 0 es 30 dl

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* 1 1	Data set is too small to comp	ıte reliable	and meaningful statistics and estimates!	
			ULAR WEIGHT PAHS  (so_sb) was not processed!	
	The data section variable collective and		OD at Welcam 17410 (60_65) was not processed.	
	It is suggested to collect at least 8 to	o 10 obser	vations before using these statistical methods!	
1 1			ves (DQO) based sample size and analytical results.	
	ii possible, compute and collect Data Qua	iity Objecti	ves (DQO) based sample size and analytical results.	•
, ,	COULD//COULDON MONEOUT AD WEIGHT DANIOL (c	\		
, ,	OS UG/KG HIGH MOLECULAR WEIGHT PAHS  (s	so_ss)		
2 1		0 1		
, ,		General		
2 1	Number of Valid Data	-	Number of Detected Data	
, ,	Number of Distinct Detected Data		Number of Non-Detect Data	-
1 1	Tolerance Factor		Percent Non-Detects	15.009
	Number of Missing Values	/5		
1 4				
	Raw Statistics		Log-transformed Statistics	
	Minimum Detected		Minimum Detected	
	Maximum Detected	—	Maximum Detected	
. 1	Mean of Detected		Mean of Detected	
	SD of Detected		SD of Detected	
, ,	Minimum Non-Detect		Minimum Non-Detect	
	Maximum Non-Detect	260	Maximum Non-Detect	5.561
*				
1 1	Data with Multiple Detection Limits		Single Detection Limit Scenario	
	Note: Data have multiple DLs - Use of KM Method is	recommen	Number treated as Non-Detect with Single DL	
	For all methods (except KM, DL/2, and ROS Methods	s),	Number treated as Detected with Single DL	14
	Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	65.009
		•		
1 1		Backgroun	d Statistics	
* 1	Normal Distribution Test with Detected Values	Only	Lognormal Distribution Test with Detected Value	s Only
	Shapiro Wilk Test Statistic	0.799	Shapiro Wilk Test Statistic	0.958
	5% Shapiro Wilk Critical Value	0.933	5% Shapiro Wilk Critical Value	0.933
	Data not Normal at 5% Significance Leve	ı	Data appear Lognormal at 5% Significance Le	evel
4 1				
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	DL/2 Substitution Method		DL/2 Substitution Method	
	Mean	265.1	Mean (Log Scale)	5.279
'	SD	238.3	SD (Log Scale)	0.756
,	95% UTL 90% Coverage	667.8	95% UTL 90% Coverage	704.4
1	95% UPL (t)	671.6	95% UPL (t)	713
,	90% Percentile (z)		90% Percentile (z)	
,	95% Percentile (z)		95% Percentile (z)	
*	99% Percentile (z)		99% Percentile (z)	
	22.2. 2.2 (2)	-	(2)	
	Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
	,	94.96	Mean in Original Scale	267 5
		407.9	SD in Original Scale	
	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
3	55% GTE With 55% GOVERNGE		95% BCA UTL with 90% Coverage	
7			95% Bootstrap (%) UTL with 90% Coverage	
	95% UPL (t)	790 R	95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)		99% Percentile (z)	
	33 % Fercentile (2)	1044	99 % reiceitile (2)	1132
	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Datasted Values C	)nh/
	Gamma Distribution Test with Detected Values	_	Data Distribution Test with Detected Values C	
	k star (bias corrected)		Data appear Lognormal at 5% Significance Le	vei
1 7	Theta Star		Т	
	nu star	111.4		
		1.000	,	
	A-D Test Statistic	1.003	Nonparametric Statistics	
3 ¥		0.700	12	
	5% A-D Critical Value		Kaplan-Meier (KM) Method	
			Kaplan-Meier (KM) Method Mean	266.4

	Y E C E			
1 1	5% K-S Critical Value	0.152		235.1
3 7				
1 *	Data not Gamma Distributed at 5% Significance	Level	SE of Mean	
	A 1 0 51.11.11		95% KM UTL with 90% Coverage	
_	Assuming Gamma Distribution		95% KM Chebyshev UPL	
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
, ,	Mean		90% Percentile (z)	
	Median	171	95% Percentile (z)	653
	SD	236.9	99% Percentile (z)	813.2
• •	k star	1.669	` `	
	Theta star		Gamma ROS Limits with Extrapolated Date	а
1 1	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	
	95% Percentile of Chisquare (2k)		95% Hawkins Wixley (HW) Approx. Gamma UPL	
	93% Fercentile of Chisquare (2K)	0.332	95% WH Approx. Gamma UTL with 90% Coverage	
	90% Percentile	FF0 F		
			95% HW Approx. Gamma UTL with 90% Coverage	695
_	95% Percentile			
	99% Percentile	979.4		
* 1				
. ,	Note: DL/2 is not a recommended method.			
# 1	OS UG/KG INDENO(1,2,3-CD)PYRENE  (br_na)			
	1- weliee(.ilele es.).			
		General	Statistics	
	Total Number of Observations			0
			Number of Distinct Observations	
	Tolerance Factor	N/A	Number of Missing Values	30
	Warning: This	data set	only has 0 observations!	
			and meaningful statistics and estimates!	
_	The data set for variable Osjod/RG	INDENO(	1,2,3-CD)PYRENE  (br_na) was not processed!	
* 1		-		
* :		-	vations before using these statistical methods!	
• •	It is suggested to collect at least 8 to	o 10 obser		).
* 1	It is suggested to collect at least 8 to	o 10 obser	vations before using these statistical methods!	).
* *	It is suggested to collect at least 8 to	o 10 obser	vations before using these statistical methods!	).
	It is suggested to collect at least 8 to	o 10 obser	vations before using these statistical methods!	).
* * *	It is suggested to collect at least 8 to	o 10 obser	vations before using these statistical methods!	). 
	It is suggested to collect at least 8 to	o 10 obser	vations before using these statistical methods!	).
	It is suggested to collect at least 8 to	o 10 obser lity Object	vations before using these statistical methods! ives (DQO) based sample size and analytical results	<b>5.</b>
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual	o 10 obser lity Object	vations before using these statistical methods! ives (DQO) based sample size and analytical results Statistics	
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations	o 10 obser lity Object	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations	0
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	It is suggested to collect at least 8 to If possible, compute and collect Data Qual	o 10 obser lity Object	vations before using these statistical methods! ives (DQO) based sample size and analytical results Statistics	0
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations	o 10 obser lity Object	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations	0
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations	o 10 obser lity Object	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations	0
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor	General  0  N/A	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values	0
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This	General  N/A	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations!	0
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu	General  N/A  s data set at reliable	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!	0
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu	General  N/A  s data set at reliable	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations!	0
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG	General  O N/A  s data set litte reliable INDENO(	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!	0
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG   It is suggested to collect at least 8 to	General  O N/A  s data set litte reliable INDENO(100 observed)	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  vations before using these statistical methods!	0 100
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG   It is suggested to collect at least 8 to	General  O N/A  s data set litte reliable INDENO(100 observed)	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!	0 100
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG   It is suggested to collect at least 8 to	General  O N/A  s data set litte reliable INDENO(100 observed)	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  vations before using these statistical methods!	0 100
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG   It is suggested to collect at least 8 to	General  O N/A  s data set litte reliable INDENO(100 observed)	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  vations before using these statistical methods!	0 100
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG   It is suggested to collect at least 8 to	General  O N/A  s data set litte reliable INDENO(100 observed)	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  vations before using these statistical methods!	0 100
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute to the data set for variable OS UG/KG   It is suggested to collect at least 8 to If possible, compute and collect Data Qual	General  O N/A  s data set litte reliable INDENO(100 observed)	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  vations before using these statistical methods!	0 100
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG   It is suggested to collect at least 8 to	General  O N/A  s data set litte reliable INDENO(100 observed)	vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  vations before using these statistical methods!	0 100
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute to the data set for variable OS UG/KG   It is suggested to collect at least 8 to If possible, compute and collect Data Qual	General  O N/A  s data set entereliable INDENO(  o 10 obserelity Objection	rvations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results	0 100
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute to the data set for variable OS UG/KG   It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_ss)	General  N/A  s data set et reliable INDENO(  10 0bser lity Object	rvations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics	0 100
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute to compute the data set for variable OS UG/KG   It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_ss)	General  O N/A  s data set et reliable INDENO(  O 10 obser lity Object  General	rvations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data	0 100
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	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG   It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Warning: Dat This is not enough to compute in the same set of the same se	General  O N/A  s data set et reliable INDENO(  O 10 obser lity Object  General  40  2 ta set has meaningful	rvations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data only 2 Detected Values. If and reliable test statistics and estimates.	0 100
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG   It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Warning: Dat This is not enough to compute in the same set of the same se	General  O N/A  s data set et reliable INDENO(  O 10 obser lity Object  General  40  2 ta set has meaningful	Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data only 2 Detected Values.	0 100
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG   It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Warning: Dat This is not enough to compute in No set in the suggested to collect at least 8 to If possible the suggested to collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_ss)	General  O N/A  s data set of the reliable of	rvations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data only 2 Detected Values. If and reliable test statistics and estimates.  ill be produced!	0 100 3.
	It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS UG/KG   It is suggested to collect at least 8 to If possible, compute and collect Data Qual OS UG/KG INDENO(1,2,3-CD)PYRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Warning: Dat This is not enough to compute in the same set of the same se	General  O N/A  s data set of the reliable of	rvations before using these statistical methods!  ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! 1,2,3-CD)PYRENE  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data only 2 Detected Values. If and reliable test statistics and estimates.	0 100 3.

		,		
	Raw Statistics		Log-transformed Statistics	
	Minimum Detected	60	Minimum Detected	4.004
	Maximum Detected		Maximum Detected	
	Mean of Detected	_	Mean of Detected	
	SD of Detected		SD of Detected	
	Minimum Non-Detect	170	Minimum Non-Detect	5.136
0 1 3	Maximum Non-Detect	310	Maximum Non-Detect	5.737
	Data with Multiple Detection Limits		Single Detection Limit Scenario	,
	Note: Data have multiple DLs - Use of KM Method is		Number treated as Non-Detect with Single DL	
	For all methods (except KM, DL/2, and ROS Methods	s),	Number treated as Detected with Single DL	0
	Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
	Warning: Data se	et has only	2 Distinct Detected Values.	
	This may not be adequate enough to co	ompute me	eaningful and reliable test statistics and estimates.	
0 1 1	The Project Team may decide to use alternative site	specific v	alues to estimate environmental parameters (e.g., E	PC, BTV
		<u> </u>		
	Unless Data Quality Objectives (DQOs) ha	ave been n	net, it is suggested to collect additional observations	<b>3.</b>
	, ,			
	The number of detected data may not be adec	guate enou	igh to perform GOF tests, bootstrap, and ROS meth	ods.
			A' value on your output display!	
	Those methods will h	Gluin a 14/	A value on your output display:	
	It is management a house A	D!	ations Values for he status a mostle ada	
			stinct Values for bootstrap methods.	
			9 distinct values may not be reliable.	
	It is recommended to have 10 to 15 or more	observation	ons for accurate and meaningful results and estimate	es.
	I	Backgroun	d Statistics	
	Normal Distribution Test with Detected Values	Only	Lognormal Distribution Test with Detected Value	s Only
0 3 0	Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	
0 1 1	5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	
		,, .		
0 1 1	Data not Normal at 5% Significance Level			
* 1 1	Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Lev	
0 3 7			Data not Lognormal at 5% Significance Lev	
6 7 4 6 7 4 6 7 3	Assuming Normal Distribution		Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution	/el
e 3 T	Assuming Normal Distribution DL/2 Substitution Method		Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method	rel
e 3 4 e 3 4	Assuming Normal Distribution  DL/2 Substitution Method  Mean	122	Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)	<b>vel</b> 4.794
e 3 7 e 3 7 e 3 7 e 3 7	Assuming Normal Distribution  DL/2 Substitution Method  Mean SD	122 14.8	Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)	4.794 0.147
e 3 7	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage	122 14.8 147	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage	4.794 0.147 154.9
e 3 7 e 3 7 e 3 7 e 3 7 e 3 7 e 3 8	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)	122 14.8 147 147.2	Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)	4.794 0.147 154.9
0 1 7 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage	122 14.8 147 147.2	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage	4.794 0.147 154.9 155.2
0 3 7 0 3 7 0 3 7 0 3 7 0 3 7 0 3 7	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)	122 14.8 147 147.2 140.9	Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)	4.794 0.147 154.9 155.2 145.9
0 1 7 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	122 14.8 147 147.2 140.9 146.3	Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	4.794 0.147 154.9 155.2 145.9 153.9
* 1 7 * * * * * * * * * * * * * * * * *	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3	Data not Lognormal at 5% Significance Lev  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	4.794 0.147 154.9 155.2 145.9 153.9
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  99% Percentile (z)	4.794 0.147 154.9 155.2 145.9 153.9
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  99% Percentile (z)  Log ROS Method	4.794 0.147 154.9 155.2 145.9 170
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale	4.794 0.147 154.9 155.2 145.9 170
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  SD (ROS Method)  Mean in Original Scale  SD in Original Scale	4.794 0.147 154.9 155.2 145.9 170 N/A N/A
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  10	4.794 0.147 154.9 155.2 145.9 170 N/A N/A
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 299% Percentile (z) SD (ROS Method Mean in Original Scale SD in Original Scale Mean in Log Scale	4.794 0.147 154.9 155.2 145.9 170 N/A N/A N/A
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UTL 90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  10	4.794 0.147 154.9 155.2 145.9 170 N/A N/A N/A N/A
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  SD (Log Scale)  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  SD in Log Scale  SD in Log Scale  95% UTL 90% Coverage  95% UPL (t)	4.794 0.147 154.9 155.2 145.9 170 N/A N/A N/A N/A
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 90% Ros Method Mean in Original Scale SD in Original Scale SD in Log Scale 95% UTL 90% Coverage 95% UTL 90% Coverage	4.794
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 95% Ros Method Mean in Original Scale SD in Original Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UTL 90% Coverage 95% UTL 90% Coverage	4.794 0.147 154.9 155.2 145.9 170 N/A N/A N/A N/A
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 90% Ros Method Mean in Original Scale SD in Original Scale SD in Log Scale 95% UTL 90% Coverage 95% UTL 90% Coverage	4.794   0.147   154.9   155.2   145.9   170   N/A   N/A   N/A   N/A   N/A   N/A
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4	Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 95% Ros Method Mean in Original Scale SD in Original Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UTL 90% Coverage 95% UTL 90% Coverage	4.794 0.147 154.9 155.2 145.9 170 N/A N/A N/A N/A N/A N/A
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	122 14.8 147 147.2 140.9 146.3 156.4 N/A	Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 95% Ros Method Mean in Original Scale SD in Original Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UTL 90% Coverage 95% UTL 90% Coverage	N/A N/A N/A N/A N/A
	Assuming Normal Distribution  DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method	122 14.8 147 147.2 140.9 146.3 156.4 N/A	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  SD in Log Scale  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	4.794
	Assuming Normal Distribution  DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method  Gamma Distribution Test with Detected Values	122 14.8 147 147.2 140.9 146.3 156.4 N/A	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  SD in Log Scale  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Percentile (z)  95% Percentile (z)  95% Percentile (z)	4.794
	Assuming Normal Distribution  DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method  Gamma Distribution Test with Detected Values k star (bias corrected) Theta Star	122 14.8 147 147.2 140.9 146.3 156.4 N/A N/A	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  SD in Log Scale  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Percentile (z)  95% Percentile (z)  95% Percentile (z)	4.794
	Assuming Normal Distribution  DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) Maximum Likelihood Estimate(MLE) Method  Maximum Distribution Test with Detected Values k star (bias corrected)	122 14.8 147 147.2 140.9 146.3 156.4 N/A	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  SD in Log Scale  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Percentile (z)  95% Percentile (z)  95% Percentile (z)	4.794
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Gamma Distribution Test with Detected Values  k star (bias corrected)  Theta Star  nu star	122 14.8 147 147.2 140.9 146.3 156.4 N/A N/A N/A N/A	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  SD in Log Scale  SD in Log Scale  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  Data Distribution Test with Detected Values (c)  Data do not follow a Discernable Distribution (d)	4.794
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Maximum Likelihood Estimate(MLE) Theta Star  nu star  A-D Test Statistic	122 14.8 147 147.2 140.9 146.3 156.4 N/A N/A N/A N/A N/A	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  SD in Log Scale  SD in Log Scale  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  Data Distribution Test with Detected Values (c)  Data do not follow a Discernable Distribution (d)	4.794
	Assuming Normal Distribution  DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (x) Maximum Likelihood Estimate (MLE) Method  Maximum Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value	122 14.8 147 147.2 140.9 146.3 156.4 N/A N/A N/A N/A N/A	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  SD in Log Scale  SD in Log Scale  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)	4.794
	Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Maximum Likelihood Estimate(MLE) Theta Star (bias corrected)  Theta Star  nu star  A-D Test Statistic  5% A-D Critical Value  K-S Test Statistic	122 14.8 147 147.2 140.9 146.3 156.4 N/A N/A N/A N/A N/A N/A	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  SD in Log Scale  95% UTL 90% Coverage  95% UTL 90% Coverage  SD in Log Scale  SD in Log Scale  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  Data Distribution Test with Detected Values C  Data do not follow a Discernable Distribution (0)  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean	4.794
	Assuming Normal Distribution  DL/2 Substitution Method  Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (x) Maximum Likelihood Estimate (MLE) Method  Maximum Distribution Test with Detected Values k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value	122 14.8 147 147.2 140.9 146.3 156.4 N/A N/A N/A N/A N/A N/A N/A	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale  SD in Original Scale  SD in Log Scale  SD in Log Scale  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)	4.794

		95% KM UTL with 90% Coverage	111 1
Assuming Gamma Distribution		95% KM Chebyshev UPL	
Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
·	N/A		
Mean		90% Percentile (z)	
Median	N/A	95% Percentile (z)	
SD	N/A	99% Percentile (z)	123.2
k star	N/A		
Theta star	N/A	Gamma ROS Limits with Extrapolated Data	
Nu star	N/A	95% Wilson Hilferty (WH) Approx. Gamma UPL	N/A
95% Percentile of Chisquare (2k)	N/A	95% Hawkins Wixley (HW) Approx. Gamma UPL	N/A
1		95% WH Approx. Gamma UTL with 90% Coverage	N/A
90% Percentile	N/A	95% HW Approx. Gamma UTL with 90% Coverage	N/A
95% Percentile	N/A		
99% Percentile	N/A		
Note: DL/2 is not a recommended method.			
-			
OS UG/KG ISOPHORONE  (br_na)			
,			
1		Statistics	
Total Number of Observations	-	Number of Distinct Observations (	-
Tolerance Factor	N/A	Number of Missing Values	30
·			
		only has 0 observations!	
		and meaningful statistics and estimates!	
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OS UG/KG ISOPHORONE  (so_sb)			
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	у ј с ј			
1 1 1	95% UPL (t)	152.5	95% UPL (t)	160.9
111	( )		95% OPL (t) 90% Percentile (z)	
111	90% Percentile (z)			
111	95% Percentile (z)		95% Percentile (z)	
111	99% Percentile (z)	1/1./	99% Percentile (z)	210.2
, , ,	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
1 1 +			Mean in Original Scale	
			SD in Original Scale	
, , ,			Mean in Log Scale	4.19
. 1 1 1			SD in Log Scale	0.157
2 4 2			95% UTL 90% Coverage	86.14
			95% UPL (t)	86.36
			90% Percentile (z)	
1 * *			95% Percentile (z)	
1 1 1			99% Percentile (z)	
1 1 1			()	
1 1 4	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values (	Only
1 1 0	k star (bias corrected)		Data appear Gamma Distributed at 5% Significant	
1 1 1	Theta Star		Bata appear Garrina Bistributed at 3 % Oignineand	C LCVCI
1 1 1	nu star			
2 1 2	nu star	111.2		
2 1 1	A D.T. of Order	0.711	Managana Ada Oradada	
1 1 1	A-D Test Statistic		Nonparametric Statistics	
2 4 4	5% A-D Critical Value		Kaplan-Meier (KM) Method	
1 1 1	K-S Test Statistic		Mean	
	5% K-S Critical Value			13.37
	Data appear Gamma Distributed at 5% Significan	ce Level	SE of Mean	
1 1 4			95% KM UTL with 90% Coverage	
2 4 0	Assuming Gamma Distribution		95% KM Chebyshev UPL	126.2
1 * 1	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	90.04
1 1 1	Mean	67.98	90% Percentile (z)	84.37
1 4 1	Median	69.95	95% Percentile (z)	89.23
1 4 4	SD	10.7	99% Percentile (z)	
		39.45	( )	
1 * *	Theta star		Gamma ROS Limits with Extrapolated Dat	а
1 1 1	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	
1 * *	95% Percentile of Chisquare (2k)		95% Hawkins Wixley (HW) Approx. Gamma UPL	
1 4 4	00701 0100111110 01 01110444110 (211)		95% WH Approx. Gamma UTL with 90% Coverage	
1 1 0	90% Percentile	82 16	95% HW Approx. Gamma UTL with 90% Coverage	
1 1 1	95% Percentile		30% TIVY Approx. damina 612 with 30% coverage	00.00
1 1 1		95.66		
1 1 1	99% Percentile	95.66		
2 2 4 2 2 4 2 2 3 2		95.66		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	99% Percentile	95.66		
1 2 1	99% Percentile  Note: DL/2 is not a recommended method.		Statistics	
3 1 3 1 1 2 1 3 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)	General	Statistics  Number of Distinct Observations	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations	General	Number of Distinct Observations	
	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)	General		
1 2 1 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor	General 0 N/A	Number of Distinct Observations Number of Missing Values	
	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This	General 0 N/A s data set	Number of Distinct Observations Number of Missing Values only has 0 observations!	
	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This	General  0  N/A  s data set	Number of Distinct Observations Number of Missing Values only has 0 observations! and meaningful statistics and estimates!	
	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This	General  0  N/A  s data set	Number of Distinct Observations Number of Missing Values only has 0 observations!	
	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS U	General  0  N/A  s data set ute reliable	Number of Distinct Observations Number of Missing Values  only has 0 observations! a and meaningful statistics and estimates!  PHTHALENE  (br_na) was not processed!	
	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS U	General  0  N/A  s data set ute reliable IG/KG NAI	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! PHTHALENE  (br_na) was not processed!  rvations before using these statistical methods!	30
	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS U	General  0  N/A  s data set ute reliable IG/KG NAI	Number of Distinct Observations Number of Missing Values  only has 0 observations! a and meaningful statistics and estimates!  PHTHALENE  (br_na) was not processed!	30
	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS U	General  0  N/A  s data set ute reliable IG/KG NAI	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! PHTHALENE  (br_na) was not processed!  rvations before using these statistical methods!	30
	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS U	General  0  N/A  s data set ute reliable IG/KG NAI	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! PHTHALENE  (br_na) was not processed!  rvations before using these statistical methods!	30
	Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compute the data set for variable OS U  It is suggested to collect at least 8 to If possible, compute and collect Data Qual	General  0  N/A  s data set ute reliable IG/KG NAI	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! PHTHALENE  (br_na) was not processed!  rvations before using these statistical methods!	30
	99% Percentile  Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable OS U	General  0  N/A  s data set ute reliable IG/KG NAI	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! PHTHALENE  (br_na) was not processed!  rvations before using these statistical methods!	30
	Note: DL/2 is not a recommended method.  OS UG/KG NAPHTHALENE  (br_na)  Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compute the data set for variable OS U  It is suggested to collect at least 8 to If possible, compute and collect Data Qual	General  0  N/A  s data set ute reliable IG/KG NAI	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! PHTHALENE  (br_na) was not processed!  rvations before using these statistical methods!	30
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	*	C B	h	e e			r
3 7 # 3		Tolerance Fac	tor N/A		-	Number of Missing Values 100	
. 1 * *				•		,	
2 7 * *		Warning: 7	This data set	only has 0	observation	ons!	
2 7 4 7		Data set is too small to con	npute reliable	and mean	ingful stat	istics and estimates!	
1 1 4 1		The data set for variable OS	JUG/KG NAI	PHTHALEN	VE  (so_sb	) was not processed!	
2 7 9 7							
2 7 9 9	It is	suggested to collect at least	8 to 10 obse	rvations be	fore using	these statistical methods!	
2 7 9 8	If possible	, compute and collect Data Q	uality Object	ives (DQO	) based sa	ample size and analytical results.	
2 7 9 9							
1 7 9 1							
2 7 9 8							
2 7 8 8	OS UG/KG NAPHT	HALENE  (so_ss)					
3 7 1 0							
2 1 1 1			General	Statistics			
3 7 7 7		Number of Valid Da	ata 40			Number of Detected Data 0	
3 7 1 7	١	Number of Distinct Detected Da	ata 0			Number of Non-Detect Data 40	
3 7 1 1							
2 7 7 7	Warning: A	II observations are Non-Detec	cts (NDs), the	erefore all s	statistics a	nd estimates should also be NDs!	
2 7 1 4						ing below the largest detection limit!	
2 7 7 2						vironmental parameters (e.g., EPC, E	BTV)
3 7 7 8							
2 7 7 4		The data set for variable OS	IUG/KGINAI	PHTHALEN	NEI (so ss	) was not processed!	
3 7 7 0						,	
2 7 7 1							
2 7 7 7							
2 7 7 7	OS UG/KG NITRO	BENZENEI (br. na)					
2 7 7 7		1 ( = 1)					
2 7 7 7			General	Statistics			
3 7 2 4		Total Number of Observatio				Number of Distinct Observations 0	
1 7 7 1		Tolerance Fac			•	Number of Missing Values 30	
2 7 7 7						rtanizor or missing traines of	
1 1 1 +							
2 7 7 0		Warning: 7	his data set	only has 0	observation	onsi	
2 7 7 7		Data set is too small to con					
3 7 7 7		The data set for variable OS					
2 7 1 7						.,	
7 1 1 4	It is	suggested to collect at least	8 to 10 obse	rvations be	fore using	these statistical methods!	
2 7 7 7						ample size and analytical results.	
3 7 7 4		,	,,	(- 4-	,	,	
3 7 7 3							
2 7 7 7							
1 1 1 +	OS UG/KG NITRO	BENZENEI (so sb)					
2 7 4 6		, ( <u>-</u> )					
2 7 4 1			General	Statistics			
3 7 7 7		Total Number of Observatio	ns 0		-	Number of Distinct Observations 0	
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2 7 7 7							
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2 1 1 1						ample size and analytical results.	
2 1 1 1					-	•	
2 7 7 7							
2 7 7 7							
2 7 1 1	OSIUG/KGINITROI	BENZENE  (so_ss)					
2 1 4 4							
3 T T 3			General	Statistics			
3 7 F F		Number of Valid Da		2		Number of Detected Data 0	
3 7 8 4	N	Number of Distinct Detected Da				Number of Non-Detect Data 40	
2 7 4 0	<u>'</u>	Tambér de Dictinot Detected De		1		. Isings, or non polost paid 40	
	<u> </u>						

	*	,	c	В	'		e			1	E	r
1 1 4 1	V	Varning: A	II observati	ons are No	n-Detects	(NDs), the	erefore all	statistics a	nd estimat	es should	also be ND	s!
3 7 4 3											detection l	
3 7 4 7											ers (e.g., E	
1 7 4 4			,	10 400 4.10		- оросиис и					<u> </u>	, ,
1 7 4 8	1		The data	set for varia	able OSILIO	2/KGINITE	ORENZE	NEL/en es	e) was not	nrocessor		
5 Y * *			THE data	Set IOI Valle	able Color	аларин	TODLINE	NE (30_33	y was not	processed	-	
1 7 4 1												
1 7 4 8	-											
	osjug/k	G N-NITR	OSO-DI-N	-PROPYLA	MINE  (br	_na)						
1 1 1 1						General	Statistics					
			Total Nu	mber of Ob	servations	0		1			servations	
1 1 1 1				Tolera	nce Factor	N/A			Num	ber of Miss	sing Values	30
3 7 3 7												
3 7 3 4												
3 7 3 4				Wa	arning: This	s data set	only has 0	observation	ns!			
1 1 1 1			Data set	is too sma						estimates!		
	†	The data	a set for va								rocessed!	
1 1 1 +												
2 7 7 9		lt io	suggested	l to collect	ot looot 9 t	a 10 abaa	netiona ha	fore using	those stat	iatical mat	hodol	
2 7 7 7												
1 7 7 2	ļ	ii possibie	e, compute	and conect	Data Qua	iity Object	ives (DQO	) baseu sa	ilipie size	anu anaiy	tical results	•
	osjug/k	G N-NITR	OSO-DI-N	-PROPYLA	AMINE  (so	_sb)						
3 7 7 3						General	Statistics					
			Total Nu	mber of Ob	servations	0		1	Number of	Distinct Ob	servations	0
2 7 7 4				Tolera	nce Factor	N/A			Num	ber of Miss	sing Values	100
2 7 # 0												
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1 T + T			Doto oot	is too sma						notimotool		
2 7 4 1		The det										
1 T + T		The data	a set for va	mable OSIC	ou/Kujiv-i	WITKUSU-	-DI-N-PRC	P I LAWIIN	El (80 <sup>8</sup> 0)	was not p	ocesseu!	
2 7 # 4		la !-			-4  4 0 4	- 10 -h			46		la a da l	
1 7 4 1			suggested									
1 7 4 7		it possible	e, compute	and collect	Data Qua	iity Object	ives (DQO	) based sa	mpie size	and analy	tical results	•
	OS UG/K	G N-NITR	OSO-DI-N	-PROPYLA	AMINE  (so	_ss)						
2 4 4 1						General	Statistics					
				Number of	Valid Data	40			Nun	ber of Det	ected Data	1
		N	Number of D	Distinct Dete	ected Data	1			Numbe	er of Non-D	Detect Data	39
						-						
	Warning:	Only one	distinct dat	ew aulew e	e detected	II Drol ICI	(or any oth	or coffwar	a) should	not he use	d on such a	data cot
											parameters	
	jested to t	ise allema	auve site s	Jecilic valu	es determi	ned by the	Project i	eam to est	illiate elivi	ronnentai	parameters	s (e.g., ⊏i
	-	Th			10//00:::	UTDOOC	DI 11 P	DVI 41111	<b>-</b> 1/s : `		"	
		i ne data	a set for va	ırıadie OS l	uG/KG N-I	NITROSO-	-טו-N-PRC	PYLAMIN	⊏  (so_ss)	was not p	rocessed!	
	<u> </u>											
	OS UG/K	GIN-NITR	OSODIPH	ENYLAMIN	IE  (br_na)	<u> </u>						
										<u></u>		
						General	Statistics					
	1		Total Nu	mber of Ob	servations	1		1	Number of	Distinct Of	servations	0
3 4 1 8	1				nce Factor	N/A					sing Values	
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	ļ		D.: 1					observation				
				is too sma								
		The d	ata set for	variable O	S UG/KG N	N-NITROS	ODIPHEN	YLAMINE	(br_na) w	as not pro	cessed!	

	Y	,	c	D	,	h	e		1	1 8	r
. 1 1 1										istical methods!	
	lf	possible,	compute	and collect	Data Qua	lity Object	ves (DQO)	based sa	mple size	and analytical result	3.
2 1 2 4											
2 1 2 0	OS UG/KG	IN_NITD(	SODIBHE	ENIVI AMIN	IFI (en eh	`					
2 1 1 1	oojoane	4114-141111	300DII 11L		ILI (30_3D	<u> </u>					
3 1 1 3						General	Statistics				
2 1 1 7			Total Nur	mber of Ob	servations	0		١	Number of	Distinct Observations	0
2 1 1 1				Tolera	nce Factor	N/A			Num	ber of Missing Values	100
2 1 1 1											
2 1 1 1			Data set				only has 0 and mean			notimetee!	
2 7 2 0		The da								as not processed!	
		THO GO	114 001 101 1	ranable et	o antan	11111100	ODII IIIZIVI		(00_05) 11	ao not processa.	
		It is	suggested	to collect	at least 8 t	o 10 obser	vations be	fore using	these stat	istical methods!	
2 1 1 1	lf									and analytical result	S.
2 1 1 7											
3 1 1 1	OSILIC/IVO	IN NITO	Jeonini.	ENIVI ABAIR	IEI (oo. se	\					
3 4 4 3	OS UG/KG	ajin-ini i KC	JOUDIPAL	-ia i FWMIN	ı∟  (SU_SS	'					
						General	Statistics				
2 1 1 0			I	Number of	Valid Data	40			Num	ber of Detected Data	0
2 1 1 0		N	umber of D	istinct Dete	ected Data	0			Numbe	er of Non-Detect Data	40
2 1 1 1										es should also be NI	
2 1 1 1										the largest detection al parameters (e.g., l	
2 1 1 1	THE FTOJEC	t realli ili	ay ueciue	to use alte	IIIauve Sik	s specific v	alues to es	sumate em	VIIOIIIIGIIA	ai parameters (e.g., i	_F C, D1 V).
2 1 1 1		The da	ta set for v	variable OS	SJUG/KGIN	N-NITROS	ODIPHEN	/LAMINE	(so_ss) w	as not processed!	
3 4 4 3										•	
2 * * *											
	001110414										
2 4 4 1	OS UG/KG	iJPENTAC	CHLOROP	HENOLI (E	or_na)						
3 7 7 3						General	Statistics				
2 4 4 1			Total Nur	mber of Ob	servations		Cidiotioo		lumber of	Distinct Observations	0
2 4 4 4					nce Factor	-				ber of Missing Values	
						1	ļ.				"
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2 * * *		The					and mean			not processed!	
		1116	uala sel IC	n variable	OSJOG/RC	AILEMIAC	HLUNUFI	IENOLI (D	i_iia) was	not processed:	
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3 1 3 3	If									and analytical result	S
3 4 3 7											
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3 4 3 4	001107/0	NDENTAG		UENO!!!	- a-h\						
3 4 3 3	OS UG/KG	ILEN I AC	HLUKUP	HENULI (S	o_SD)						
3 4 3 8						General	Statistics				
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3 4 4 4		ıne	uata set fo	variable	osjuG/KC	alcen I AC	HLUKUPF	IENUL  (S	o_sd) was	not processed!	
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	y 1 c 1	h	e			,	r	
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	OS UG/KG PENTACHLOROPHENOL  (so_ss)							
	Coloanali Entraorizono rizino el (30_33)							
3 T + T		General	Statistics					
5 T + T	Number of Valid Data		Otatiotics		Nun	nber of Dete	acted Data	n
2 4 4 4	Number of Distinct Detected Data					er of Non-D		
1 4 4 1	Number of Distinct Detected Data	0			INGITIO	CI OI NOII-D	CICCI Data	40
2 * * *	Warning: All observations are Non-Detects	(NDs) the	refore all s	tatistics ar	nd estimat	tes should :	also he NC	)el
	Specifically, sample mean, UCLs, UPLs, and							
	The Project Team may decide to use alternative site							
2 1 1	The Frejor Fount may decide to dee diternative site	оробіно (	uluoo to o	Juniato on	711 01111101110	ai paramot	310 (0.g., L	-1 0, 5 1 1)
1 T T T	The data set for variable OS UG/KG	IPENTAC	HLOROPH	HENOLI (se	ss) was	not proces	sed!	
2 4 4 7		.,			<u>,</u>	<b>p</b>		
2 T T T								
2 4 4 4	OS UG/KG PHENANTHRENE  (br_na)							
1 4 4 1								
1 Y * Y		General	Statistics					
	Total Number of Observations			N	lumber of	Distinct Ob	servations	0
2 1 1 0	Tolerance Factor	N/A		•		ber of Miss		_
							<b>.</b>	
2 4 1 1								
2 4 1 4	Warning: This	data set	only has 0	observatio	ns!			
2 1 1 1	Data set is too small to compu					estimates!		
	The data set for variable OS UG							
3 1 1 1					,		-	
1 1 1 1	It is suggested to collect at least 8 to	10 obser	vations be	fore usina	these stat	tistical meth	nods!	
	If possible, compute and collect Data Qual							3.
		, ,	· · · · · · · · · · · · · · · · · · ·	,				
2 1 1 1								
2 8 3 3 2 8 3 1	OS UG/KG PHENANTHRENE  (so_sb)							
7 4 2 4 7 4 3 4			Statistics					
3 Y 3 T	Total Number of Observations	0	Statistics	N		Distinct Ob		
2			Statistics	N		Distinct Ob		
	Total Number of Observations	0	Statistics	N				
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Total Number of Observations Tolerance Factor	0 N/A			Num			
	Total Number of Observations Tolerance Factor  Warning: This	0 N/A	only has 0	observatio	Num	ber of Miss		
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu	0 N/A s data set	only has 0	observatio	Num	ber of Miss	ing Values	
	Total Number of Observations Tolerance Factor  Warning: This	0 N/A s data set	only has 0	observatio	Num	ber of Miss	ing Values	
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG	0 N/A s data set te reliable	only has 0 and mean NANTHRE	observatio ingful stati NE  (so_st	Num ns! stics and ) was not	ber of Miss estimates!	ing Values	
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG	N/A s data set the reliable s/KG PHE	only has 0 and mean NANTHRE vations be	observatio ingful stati NE  (so_st	Num  ns! stics and b) was not	estimates! tiprocessed	ing Values	100
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG	N/A s data set the reliable s/KG PHE	only has 0 and mean NANTHRE vations be	observatio ingful stati NE  (so_st	Num  ns! stics and b) was not	estimates! tiprocessed	ing Values	100
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG	N/A s data set the reliable s/KG PHE	only has 0 and mean NANTHRE vations be	observatio ingful stati NE  (so_st	Num  ns! stics and b) was not	estimates! tiprocessed	ing Values	100
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG	N/A s data set the reliable s/KG PHE	only has 0 and mean NANTHRE vations be	observatio ingful stati NE  (so_st	Num  ns! stics and b) was not	estimates! tiprocessed	ing Values	100
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual	N/A s data set the reliable s/KG PHE	only has 0 and mean NANTHRE vations be	observatio ingful stati NE  (so_st	Num  ns! stics and b) was not	estimates! tiprocessed	ing Values	100
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG	N/A s data set the reliable s/KG PHE	only has 0 and mean NANTHRE vations be	observatio ingful stati NE  (so_st	Num  ns! stics and b) was not	estimates! tiprocessed	ing Values	100
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual	N/A s data set te reliable h/KG PHE	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st	Num  ns! stics and b) was not	estimates! tiprocessed	ing Values	100
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG PHENANTHRENE  (so_ss)	N/A s data set te reliable h/KG PHE	only has 0 and mean NANTHRE vations be	observatio ingful stati NE  (so_st	ns! stics and b) was not these stat mple size	estimates! t processed tistical meti	ing Values	3.
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual	N/A s data set te reliable 6/KG PHEl to 10 obserlity Object	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st	ns! stics and o) was not these stat mple size	estimates! t processed tistical meti and analyt	III IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	100 S.
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG PHENANTHRENE  (so_ss)	N/A s data set te reliable 6/KG PHEl o 10 obser lity Object	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st	ns! stics and o) was not these stat mple size	estimates! t processed tistical meti and analyt	II nods! ical results	100 3.
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG PHENANTHRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor	o N/A s data set te reliable 6/KG PHEI to 10 obser lity Object  General 40 15 1.69	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st	ns! stics and o) was not these stat mple size	estimates! t processed tistical meti and analyt	II nods! ical results	100 3.
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG PHENANTHRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data	o N/A s data set te reliable 6/KG PHEI to 10 obserlity Objecti  General 40 15 1.69	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st	ns! stics and o) was not these stat mple size	estimates! t processed tistical meti and analyt	II nods! ical results	100 3.
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG PHENANTHRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values	o N/A s data set te reliable 6/KG PHEI to 10 obserlity Objecti  General 40 15 1.69	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st fore using ) based sa	ns! stics and on these statemple size  Num Number	estimates! t processed tistical meti and analyt	II nods! ical results ected Data etect Data on-Detects	100 3.
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG PHENANTHRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics	o N/A s data set te reliable h/KG PHE  o 10 obser lity Object  General 40 15 1.69 75	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st fore using ) based sa	ns! stics and on these statemple size  Num Number	estimates! it processed tistical methand analyt mber of Dete	ing Values  II  nods! ical results  ected Data etect Data on-Detects	17 23 57.50%
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG PHENANTHRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected	O N/A S data set te reliable h/KG PHE  D 10 obser lity Object  General 40 15 1.69 75	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st fore using ) based sa	ns! stics and on these statemple size  Num Number	estimates! it processed tistical methand analyt  mber of Deterer of Non-D Percent No	ing Values  II  nods! ical results  ected Data etect Data on-Detects ics in Detected	17 23 57.50%
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG PHENANTHRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected	O N/A  S data set te reliable b/KG PHE  D 10 obser lity Object  General  40 15 1.69 75	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st fore using ) based sa	ns! stics and on these statemple size  Num Number	estimates! it processed tistical methand analyt  mber of Deterer of Non-D Percent Note med Statist Minimum Maximum	ected Data etect Data on-Detects ics n Detected	17 23 57.50%
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG PHENANTHRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected Mean of Detected	O N/A S data set te reliable h/KG PHE  D 10 obser lity Object  General 40 15 1.69 75	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st fore using ) based sa	ns! stics and on these statemple size  Num Number	estimates! it processed tistical methand analyt  mber of Deterer of Non-D Percent Non-D Percent Non-D Maximum Maximum Mean of	ected Data etect Data on-Detects on Detected on Detected f Detected on Detecte	17 23 57.50% 3.932 4.554 4.19
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG PHENANTHRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected	General 40 15 1.69 75	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st fore using ) based sa	ns! stics and on these statemple size  Num Number	estimates! it processed tistical methand analyt  mber of Deterer of Non-D Percent Non-D Percent Non-D Maximum Maximum Mean of SD of SD of SD of SD of Statist	ected Data etect Data on-Detects ics n Detected n Detected f Detected f Detected	17 23 57.50% 3.932 4.554 4.19 0.192
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable OS UG  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  OS UG/KG PHENANTHRENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected Mean of Detected	General 40 15 1.69 75 51 95 67.24 13.78 170	only has 0 and mean NANTHRE vations be ives (DQO	observatio ingful stati NE  (so_st fore using ) based sa	ns! stics and on these statemple size  Num Number	estimates! it processed tistical methand analyt  mber of Deterer of Non-D Percent Non-D Percent Non-D Maximum Maximum Mean of	ected Data etect Data on-Detects of Detected f Detected for-Detected f	17 23 57.50% 3.932 4.554 4.19 0.192 5.136

		,		r
	Data with Multiple Detection Limits		Single Detection Limit Scenario	
	Note: Data have multiple DLs - Use of KM Method is			
	For all methods (except KM, DL/2, and ROS Methods	s),	Number treated as Detected with Single DL	
	Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00
		Backgrour	nd Statistics	
	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	s Only
'	Shapiro Wilk Test Statistic	0.866	Shapiro Wilk Test Statistic	0.907
3	5% Shapiro Wilk Critical Value	0.892	5% Shapiro Wilk Critical Value	0.892
,	Data not Normal at 5% Significance Leve	İ	Data appear Lognormal at 5% Significance Lognormal	evel
	Assuming Normal Distribution		Assuming Lognormal Distribution	
,	DL/2 Substitution Method		DL/2 Substitution Method	
3	Mean	99 64	Mean (Log Scale)	4 548
,		30.96	SD (Log Scale)	
			95% UTL 90% Coverage	160.0
	95% UTL 90% Coverage			
$\downarrow$	95% UPL (t)		95% UPL (t)	
,	90% Percentile (z)		90% Percentile (z)	
$\sqcup$	95% Percentile (z)		95% Percentile (z)	
,	99% Percentile (z)	171.7	99% Percentile (z)	210.2
•	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
*	, , , , , , , , , , , , , , , , , , , ,		Mean in Original Scale	66 85
1			SD in Original Scale	
			Mean in Log Scale	
			SD in Log Scale	
			95% UTL 90% Coverage	
_				
,			95% UPL (t)	
,			90% Percentile (z)	
_			95% Percentile (z)	
			99% Percentile (z)	95.22
*	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values 0	Only
3	k star (bias corrected)		Data appear Gamma Distributed at 5% Significand	
,	Theta Star		3	
	nu star			
	A-D Test Statistic	0 711	Nonparametric Statistics	
2	5% A-D Critical Value		Kaplan-Meier (KM) Method	
1	K-S Test Statistic		Mean	67 24
,				
	5% K-S Critical Value  Data appear Gamma Distributed at 5% Significan		SE of Mean	13.37
,	Data appear Gamma Distributed at 5% Significan	CG FGAGI		
1	Assumbs Commer Distribute		95% KM UTL with 90% Coverage	
	Assuming Gamma Distribution		95% KM Chebyshev UPL	
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
	Mean		90% Percentile (z)	
	Median	69.95	95% Percentile (z)	89.23
•	Median SD	69.95 10.7		89.23
•	Median SD k star	69.95 10.7 39.45	95% Percentile (z) 99% Percentile (z)	89.23 98.34
1 2	Median SD k star Theta star	69.95 10.7 39.45 1.723	95% Percentile (z) 99% Percentile (z) Gamma ROS Limits with Extrapolated Date	89.23 98.34 <b>a</b>
,	Median SD k star Theta star Nu star	69.95 10.7 39.45 1.723 3156	95% Percentile (z) 99% Percentile (z)  Gamma ROS Limits with Extrapolated Date 95% Wilson Hilferty (WH) Approx. Gamma UPL	89.23 98.34 <b>a</b> 86.97
2 2	Median SD k star Theta star	69.95 10.7 39.45 1.723 3156	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma ROS Limits with Extrapolated Date 95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL	89.23 98.34 <b>a</b> 86.97 87.09
* * * * * * * * * * * * * * * * * * *	Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	69.95 10.7 39.45 1.723 3156 100.6	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma ROS Limits with Extrapolated Date 95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	89.23 98.34 <b>a</b> 86.97 87.09 86.77
* 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	69.95 10.7 39.45 1.723 3156 100.6	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma ROS Limits with Extrapolated Date 95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL	89.23 98.34 <b>a</b> 86.97 87.09 86.77
	Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k) 90% Percentile 95% Percentile	69.95 10.7 39.45 1.723 3156 100.6 82.16 86.7	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma ROS Limits with Extrapolated Date 95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	89.23 98.34 <b>a</b> 86.97 87.09 86.77
	Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	69.95 10.7 39.45 1.723 3156 100.6 82.16 86.7	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma ROS Limits with Extrapolated Date 95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	89.23 98.34 <b>a</b> 86.97 87.09 86.77
	Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k) 90% Percentile 95% Percentile 99% Percentile	69.95 10.7 39.45 1.723 3156 100.6 82.16 86.7	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma ROS Limits with Extrapolated Date 95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	89.23 98.34 <b>a</b> 86.97 87.09 86.77
	Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k) 90% Percentile 95% Percentile	69.95 10.7 39.45 1.723 3156 100.6 82.16 86.7	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma ROS Limits with Extrapolated Date 95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	89.23 98.34 <b>a</b> 86.97 87.09 86.77
1	Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k) 90% Percentile 95% Percentile 99% Percentile	69.95 10.7 39.45 1.723 3156 100.6 82.16 86.7	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma ROS Limits with Extrapolated Date 95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	89.23 98.34 <b>a</b> 86.97 87.09 86.77
2	Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k) 90% Percentile 95% Percentile 99% Percentile	69.95 10.7 39.45 1.723 3156 100.6 82.16 86.7	95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  Gamma ROS Limits with Extrapolated Date 95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	89.23 98.34 <b>a</b> 86.97 87.09 86.77

2 4 1 2	Total Number of Observations 0 Number of Distinct Observations 0
3 4 1 8	Tolerance Factor N/A Number of Missing Values 30
2 * 1 *	Totalise Factor 1970
7 4 3 6	
2 4 3 1	Warning: This data set only has 0 observations!
1 4 1 1	Data set is too small to compute reliable and meaningful statistics and estimates!
2 4 3 3	
2 4 2 4	The data set for variable OS UG/KG PHENOL  (br_na) was not processed!
3 7 7 7	
	It is suggested to collect at least 8 to 10 observations before using these statistical methods!
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.
2 4 1 0	OS UG/KG PHENOL  (so_sb)
2 4 1 1	
3 4 1 1	General Statistics
3 4 1 1	Total Number of Observations 0 Number of Distinct Observations 0
2 4 3 4	Tolerance Factor N/A Number of Missing Values 100
2 4 1 4	
2 4 3 4	
3 4 3 3	Warning: This data set only has 0 observations!
3 4 3 4	Data set is too small to compute reliable and meaningful statistics and estimates!
2 4 3 4	The data set for variable OS UG/KG PHENOL  (so_sb) was not processed!
2 4 4 6	aaaa oo oo oo aaaa oo oo oo oo oo oo oo
2 4 4 1	It is suggested to collect at least 8 to 10 observations before using these statistical methods!
7 4 4 3	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.
2 4 4 3	ii possisioj somptio and someti zata dataty sujetinos (ZGO) zatos sampto size and analytical results.
2 4 4 4	
3 4 4 1	
3 4 4 4	OSHIC/KCIPHENOL (40, 40)
1 4 4 1	OS UG/KG PHENOL  (so_ss)
2 4 4 4	O annual Obstitution
	General Statistics
L	Number of Valid Data 40 Number of Detected Data 0
	Number of Distinct Detected Data 0 Number of Non-Detect Data 40
2 4 4 7	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV
	The data set for variable OS UG/KG PHENOL  (so_ss) was not processed!
	OS UG/KG PYRENE  (br_na)
2 * * 1	
3 4 4 3	General Statistics
7 4 4 1	Total Number of Observations 0 Number of Distinct Observations 0
3 4 4 4	Tolerance Factor N/A Number of Missing Values 30
2 4 4 8	
3 4 4 3	Warning: This data set only has 0 observations!
2 4 4 8	
2 * * *	
3 4 3 6	
2 4 2 1	It is suggested to collect at least 8 to 10 observations before using these statistical methods!
3 4 3 3	
2 4 2 1	possible, compare and contest bath quality objectives (bate) based cample size and analytical results.
3 4 3 4	
3 4 3 4	
3 4 3 4	
5 4 5 5	US UG/NG FTKENE  (SO_SD)
	Tolerance Factor N/A Number of Missing Values 100
	Data set is too small to compute reliable and meaningful statistics and estimates!  The data set for variable OS UG/KG PYRENE  (br_na) was not processed!  It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical resul  OS UG/KG PYRENE  (so_sb)  General Statistics  Total Number of Observations 0 Number of Distinct Observation

	Y 8 C D 1	,	1 1 1 E	
1 2				
* 1	Warning: This	s data set c	only has 0 observations!	
			and meaningful statistics and estimates!	
			PYRENE  (so_sb) was not processed!	
			., = , .	
* 1	It is suggested to collect at least 8 to	o 10 observ	vations before using these statistical methods!	
	If possible, compute and collect Data Qua	lity Objectiv	ves (DQO) based sample size and analytical results.	
, ,	OS UG/KG PYRENE  (so_ss)			
			20. 11.11	
	N. I. WEID	General		2.4
	Number of Valid Data		Number of Detected Data 3	
* 1	Number of Distinct Detected Data Tolerance Factor		Number of Non-Detect Data 6	
	Number of Missing Values		Percent Non-Detects 1	15.007
	Number of Missing Values	75		
	Raw Statistics		Log-transformed Statistics	
	Minimum Detected	44	Minimum Detected 3	3 784
. 1	Maximum Detected		Maximum Detected 5	
	Mean of Detected		Mean of Detected 4	
	SD of Detected		SD of Detected (	
٠.	Minimum Non-Detect		Minimum Non-Detect 5	
	Maximum Non-Detect		Maximum Non-Detect 5	
* 1				
	Data with Multiple Detection Limits		Single Detection Limit Scenario	
	Note: Data have multiple DLs - Use of KM Method is	recommen	Number treated as Non-Detect with Single DL 4	40
	For all methods (except KM, DL/2, and ROS Methods	s),	Number treated as Detected with Single DL (	
	Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage 1	100.00
1 1				
1 1		Backgroun		
	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Values	
	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic (	
	5% Shapiro Wilk Critical Value		5% Shapiro Wilk Critical Value (	
	Data not Normal at 5% Significance Level	l	Data appear Lognormal at 5% Significance Le	vei
	Assuming Normal Distribution		Assuming Lognormal Distribution	
1 0	DL/2 Substitution Method		DL/2 Substitution Method	
9 1	Mean	93 94	Mean (Log Scale) 4	1 489
1 1		31.19	SD (Log Scale) (	).335
2 7	95% UTL 90% Coverage		95% UTL 90% Coverage 1	
, ,	95% UPL (t)		95% UPL (t) 1	
2 1	90% Percentile (z)		90% Percentile (z) 1	
3 4	95% Percentile (z)		95% Percentile (z) 1	
2 3	99% Percentile (z)		99% Percentile (z)	
3 ¥				
	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
			Mean in Original Scale 8	
			SD in Original Scale 2	
1 1			Mean in Log Scale 4	
			SD in Log Scale 0	
			95% UTL 90% Coverage 1	
			95% UPL (t) 1	
			90% Percentile (z) 1	
			95% Percentile (z) 1	
			99% Percentile (z)	174.9
		0.1	Data Blands of T. W. D	
	6 B118 2 T 1 W 5 1 1 1 1 1 1		Data Distribution Test with Detected Values Of	niv
	Gamma Distribution Test with Detected Values			
1 0	k star (bias corrected)	8.443	Data appear Gamma Distributed at 5% Significance	
1 1		8.443 10.55		

1 1 1 1	Y Y C P 1	,		
	A-D Test Statistic	0.336	Nonparametric Statistics	
1 1 4 4	5% A-D Critical Value		Kaplan-Meier (KM) Method	
1 1 1 1	K-S Test Statistic		Mean	80 04
	5% K-S Critical Value			30.79
1 1 1 4	Data appear Gamma Distributed at 5% Significan		SE of Mean	
	Data appear Gamma Distributed at 5% Significan	ce Levei	95% KM UTL with 90% Coverage	
	A O Di-t-ih - ti			
1 1 1 2	Assuming Gamma Distribution		95% KM Chebyshev UPL	
2 2 4 7	Gamma ROS Statistics with Extrapolated Data	00.70	95% KM UPL (t)	
1 1 1 1		89.72	90% Percentile (z)	
	Median		95% Percentile (z)	
		29.27	99% Percentile (z)	160.7
		9.684		
	Theta star		Gamma ROS Limits with Extrapolated Date	
	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	
	95% Percentile of Chisquare (2k)	30.61	95% Hawkins Wixley (HW) Approx. Gamma UPL	
			95% WH Approx. Gamma UTL with 90% Coverage	
	90% Percentile	_	95% HW Approx. Gamma UTL with 90% Coverage	142.8
	95% Percentile			
	99% Percentile	170		
	Note: DL/2 is not a recommended method.			
1 1 4 1				
	OS UG/KG TOTAL PAHS  (br_na)			
1 1 1 0			Out that	
3 3 3 1	T. IN L. COL.		Statistics	0
	Total Number of Observations		Number of Distinct Observations	
1 1 1 1	Tolerance Factor	N/A	Number of Missing Values	30
1 1 1 1				
1 1 1 1	W!Th!			
1 1 1 4			only has 0 observations!	
1 1 1 1			e and meaningful statistics and estimates!  DTAL PAHS  (br_na) was not processed!	
3 3 3 K	The data set for variable OS	ou/Kuji (	TAL PARSI (br_na) was not processed:	
1 1 1 *	It is suggested to collect at least 9 t	a 10 abso	rvations before using these statistical methods!	
1 1 * *			ives (DQO) based sample size and analytical results	
1 1 1 1	ii possibio, compute and solicet bata qua	iity Object	1700 (DQO) based sample size and analytical results	•
1 1 1 1				
1 1 1 1				
	OCULO/KOITOTAL DALICI (co. ch)			
	IUSIUG/KGITUTAL PARSI (SO SD)			
3 3 7 7	OS UG/KG TOTAL PAHS  (so_sb)			
	OSIOG/RGITOTAL PARISI (SO_SB)	General	Statistics	
11 1 1		,	Statistics  Number of Distinct Observations	0
3 3 F F	Total Number of Observations	0	Number of Distinct Observations	
3 3 F F		0		
1 1 7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Total Number of Observations	0	Number of Distinct Observations	
2 2 * * 2 2 * * 2 2 * * 2 2 * * 2 2 * * 2 2 * *	Total Number of Observations Tolerance Factor	0 N/A	Number of Distinct Observations Number of Missing Values	
	Total Number of Observations Tolerance Factor  Warning: Thi	0 N/A s data set	Number of Distinct Observations Number of Missing Values only has 0 observations!	
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compo	0 N/A s data set	Number of Distinct Observations Number of Missing Values only has 0 observations! and meaningful statistics and estimates!	
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compo	0 N/A s data set	Number of Distinct Observations Number of Missing Values only has 0 observations!	
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compton The data set for variable OS	0 N/A s data set ute reliable UG/KG TC	Number of Distinct Observations Number of Missing Values only has 0 observations! and meaningful statistics and estimates!	
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compton The data set for variable OS  It is suggested to collect at least 8 to	N/A s data set ute reliable UG/KG TC	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  OTAL PAHS  (so_sb) was not processed!	100
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compton The data set for variable OS  It is suggested to collect at least 8 to	N/A s data set ute reliable UG/KG TC	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods!	100
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compton The data set for variable OS  It is suggested to collect at least 8 to	N/A s data set ute reliable UG/KG TC	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods!	100
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compton The data set for variable OS  It is suggested to collect at least 8 to	N/A s data set ute reliable UG/KG TC	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods!	100
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compton The data set for variable OS  It is suggested to collect at least 8 to	N/A s data set ute reliable UG/KG TC	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods!	100
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compt The data set for variable OS   It is suggested to collect at least 8 t  If possible, compute and collect Data Qua	N/A s data set ute reliable UG/KG TC	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods!	100
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compt The data set for variable OS   It is suggested to collect at least 8 t  If possible, compute and collect Data Qua	o N/A s data set ute reliable UG/KG TC o 10 obser	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods!	100
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compt The data set for variable OS   It is suggested to collect at least 8 t  If possible, compute and collect Data Qua	o N/A s data set ute reliable UG/KG TC o 10 obser lity Object	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results	
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compute the data set for variable OS   It is suggested to collect at least 8 to suggested to collect Data Quarter of the data set for variable OS   OS UG/KG TOTAL PAHS  (so_ss)	s data set ute reliable UG/KG TC o 10 obser lity Object  General	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics	
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compute the data set for variable OS   It is suggested to collect at least 8 to suggested to collect at least 8 to suggested to collect Data Quart of Pata Quart of Section 1. Sect	s data set ute reliable UG/KG TC o 10 obser lity Object  General 40 33	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data	
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compute the data set for variable OS   It is suggested to collect at least 8 to suggested to collect at least 8 to suggested to collect Data Quades of Data Quade	s data set ute reliable UG/KG TC o 10 obser lity Object  General 40 33 1.69	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data	
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compute the data set for variable OS   It is suggested to collect at least 8 to suggested to collect at least 8 to suggested to collect Data Quart of possible, compute and collect Data Quart of Silug/KG TOTAL PAHS  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor	s data set ute reliable UG/KG TC o 10 obser lity Object  General 40 33 1.69	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data	
	Total Number of Observations Tolerance Factor  Warning: Thi Data set is too small to compute the data set for variable OS   It is suggested to collect at least 8 to suggested to collect at least 8 to suggested to collect Data Quart of possible, compute and collect Data Quart of Silug/KG TOTAL PAHS  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor	s data set ute reliable UG/KG TC o 10 obser lity Object  General 40 33 1.69	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! OTAL PAHS  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Detected Data Number of Non-Detect Data	

	y	h h	g E 1 1 E	
	Minimum Detected	4.4	Minimum Detected	2 704
			Minimum Detected	
	Maximum Detected	-	Maximum Detected	
	Mean of Detected		Mean of Detected SD of Detected	-
. ,	SD of Detected Minimum Non-Detect		SD of Detected Minimum Non-Detect	
	Maximum Non-Detect	260	Maximum Non-Detect	5.561
	Data with Multiple Data stion Limite		Oin als Data ation I insit Ossan aris	
1 1	Data with Multiple Detection Limits		Single Detection Limit Scenario	25
	Note: Data have multiple DLs - Use of KM Method is		•	
1 4	For all methods (except KM, DL/2, and ROS Methods	5),	Number treated as Detected with Single DL	
3 0	Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	02.507
		Backgroup	d Statistics	
2 2	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	e Only
7 7	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
,	5% Shapiro Wilk Critical Value		5% Shapiro Wilk Critical Value	
,	Data not Normal at 5% Significance Leve		Data appear Lognormal at 5% Significance Lo	
*	Data not Normal at 5% Significance Leve	1	Data appear Logitornia at 5 % Significance Lo	CVCI
1	Assuming Normal Distribution		Assuming Lognormal Distribution	
	DL/2 Substitution Method		DL/2 Substitution Method	
	Mean	293	Mean (Log Scale)	5 346
٠		267.9	SD (Log Scale)	
,	95% UTL 90% Coverage		95% UTL 90% Coverage	
1	95% UPL (t)		95% UPL (t)	
7	90% Percentile (z)		90% Percentile (z)	
,	95% Percentile (z)		95% Percentile (z)	
,	99% Percentile (z)		99% Percentile (z)	
*	(2)	0.0	33 /3 / 3/33/////	.0.0
1	Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
,	Mean	113.9	Mean in Original Scale	295.7
٠	<u>-1</u>	450.7	SD in Original Scale	
٠	95% UTL with 90% Coverage		95% UTL with 90% Coverage	
	out our man out out our or age		95% BCA UTL with 90% Coverage	
3			95% Bootstrap (%) UTL with 90% Coverage	
1	95% UPL (t)	882.6	95% UPL (t)	
,	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
*	99% Percentile (z)		99% Percentile (z)	
3				.007
1	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values C	
*	Gamma Distribution Test with Detected Values k star (bias corrected)		Data Distribution Test with Detected Values C Data appear Lognormal at 5% Significance Le	Only
*		1.512		Only
*	k star (bias corrected)	1.512 213.7		Only
e e	k star (bias corrected) Theta Star nu star	1.512 213.7 102.8	Data appear Lognormal at 5% Significance Le	Only
) x	k star (bias corrected) Theta Star nu star A-D Test Statistic	1.512 213.7 102.8 0.945	Data appear Lognormal at 5% Significance Le  Nonparametric Statistics	Only
) r	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value	1.512 213.7 102.8 0.945 0.764	Data appear Lognormal at 5% Significance Le  Nonparametric Statistics  Kaplan-Meier (KM) Method	Only
3 3	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	1.512 213.7 102.8 0.945 0.764 0.188	Data appear Lognormal at 5% Significance Le  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean	Only evel
2 e e e e e e e e e e e e e e e e e e e	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	1.512 213.7 102.8 0.945 0.764 0.188 0.154	Data appear Lognormal at 5% Significance Le  Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD	294.3 264.2
2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	1.512 213.7 102.8 0.945 0.764 0.188 0.154	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean	294.3 264.2 42.51
1 e	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance	1.512 213.7 102.8 0.945 0.764 0.188 0.154	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage	294.3 264.2 42.51 740.7
2 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution	1.512 213.7 102.8 0.945 0.764 0.188 0.154	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL	294.3 264.2 42.51 740.7
2 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data	1.512 213.7 102.8 0.945 0.764 0.188 0.154 <b>b.Level</b>	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)	294.3 264.2 42.51 740.7 1460 744.9
3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution  Gamma ROS Statistics with Extrapolated Data Mean	1.512 213.7 102.8 0.945 0.764 0.188 0.154 <b>b.Level</b>	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)	294.3 264.2 42.51 740.7 1460 744.9 632.9
1 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median	1.512 213.7 102.8 0.945 0.764 0.188 0.154 <b>Level</b> 299.7 171.7	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)	294.3 264.2 42.51 740.7 1460 744.9 632.9 728.8
* * * * * * * * * * * * * * * * * * * *	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD	1.512 213.7 102.8 0.945 0.764 0.188 0.154 <b>Level</b> 299.7 171.7 266.5	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)	294.3 264.2 42.51 740.7 1460 744.9 632.9 728.8
2 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star	1.512 213.7 102.8 0.945 0.764 0.188 0.154 <b>Level</b> 299.7 171.7 266.5 1.472	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  99% Percentile (z)	294.3 264.2 42.51 740.7 1460 744.9 632.9 728.8 908.9
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star	1.512 213.7 102.8 0.945 0.764 0.188 0.154 <b>b. Level</b> 299.7 171.7 266.5 1.472 203.6	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  99% Percentile (z)	294.3 264.2 42.51 740.7 1460 744.9 632.9 728.8 908.9
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star	1.512 213.7 102.8 0.945 0.764 0.188 0.154 <b>b.Level</b> 299.7 171.7 266.5 1.472 203.6 117.7	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  95% Wilson Hilferty (WH) Approx. Gamma UPL	294.3 264.2 42.51 740.7 1460 744.9 632.9 728.8 908.9
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star	1.512 213.7 102.8 0.945 0.764 0.188 0.154 <b>b.Level</b> 299.7 171.7 266.5 1.472 203.6 117.7 7.716	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	294.3 264.2 42.51 740.7 1460 744.9 632.9 728.8 908.9 <b>a</b> 793.2 813.7
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	1.512 213.7 102.8 0.945 0.764 0.188 0.154 <b>b.Level</b> 299.7 171.7 266.5 1.472 203.6 117.7 7.716	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL	294.3 264.2 42.51 740.7 1460 744.9 632.9 728.8 908.9 <b>a</b> 793.2 813.7 785.9
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	1.512 213.7 102.8 0.945 0.764 0.188 0.154 <b>Level</b> 299.7 171.7 266.5 1.472 203.6 117.7 7.716	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% Hawkins Wixley (HW) Approx. Gamma UPL	294.3 264.2 42.51 740.7 1460 744.9 632.9 728.8 908.9 <b>a</b> 793.2 813.7 785.9
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data not Gamma Distributed at 5% Significance  Assuming Gamma Distribution Gamma ROS Statistics with Extrapolated Data Mean Median SD k star Theta star Nu star 95% Percentile of Chisquare (2k)	1.512 213.7 102.8 0.945 0.764 0.188 0.154 <b>Level</b> 299.7 171.7 266.5 1.472 203.6 117.7 7.716	Nonparametric Statistics  Kaplan-Meier (KM) Method  Mean  SD  SE of Mean  95% KM UTL with 90% Coverage  95% KM Chebyshev UPL  95% KM UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  95% Wilson Hilferty (WH) Approx. Gamma UPL  95% WH Approx. Gamma UPL  95% WH Approx. Gamma UPL	294.3 264.2 42.51 740.7 1460 744.9 632.9 728.8 908.9 <b>a</b> 793.2 813.7 785.9

* 1 *	Note: DL/2 is not a recommended method.
* 3 *	
* 1 *	OV UG/KG HEXACHLOROBUTADIENE  (br_na)
* 1 1	OV   Od / Na   I LANGI LEON OBO   ABILITE   (BI_III)
* 1 *	General Statistics
* 1 *	Total Number of Observations 0 Number of Distinct Observations 0
	Tolerance Factor N/A Number of Missing Values 30
	Tolerance Factor 1477
	Warning: This data set only has 0 observations!
	Data set is too small to compute reliable and meaningful statistics and estimates!
	The data set for variable OV UG/KG HEXACHLOROBUTADIENE  (br_na) was not processed!
* * *	It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.
	OV UG/KG HEXACHLOROBUTADIENE  (so_sb)
	General Statistics
	Total Number of Observations 0 Number of Distinct Observations 0
	Tolerance Factor N/A Number of Missing Values 100
F + 1	
	Warning: This data set only has 0 observations!
	Data set is too small to compute reliable and meaningful statistics and estimates!
	The data set for variable OV UG/KG HEXACHLOROBUTADIENE  (so_sb) was not processed!
* * 1	It is suggested to collect at least 8 to 10 observations before using these statistical methods!
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.
	OV UG/KG HEXACHLOROBUTADIENE  (so_ss)
	General Statistics
	Number of Valid Data 40 Number of Detected Data 0
+ 1 1	Number of Distinct Detected Data   0 Number of Non-Detect Data   40
* 1 1	Number of District Detected Data o Number of Non-Detect Data 40
e 1 T	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!  Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!  The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV)
	The data set for variable OV UG/KG HEXACHLOROBUTADIENE  (so ss) was not processed!
. 1 .	
* 1 1	OV UG/KG TOTAL CHLORINATED VOCS  (br_na)
* 1 1	
	General Statistics
	Total Number of Observations 0 Number of Distinct Observations 0
	Tolerance Factor N/A Number of Missing Values 30
* 1 1	
* 1 *	
	Warning: This data set only has 0 observations!
	Data set is too small to compute reliable and meaningful statistics and estimates!
* 1 1	The data set for variable OV UG/KG TOTAL CHLORINATED VOCS  (br_na) was not processed!
* 1 1	
* 1 1	It is suggested to collect at least 8 to 10 observations before using these statistical methods!
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.
	· · · · · ·
* 1 *	

	у в с в	1	0 8	1 1		r				
1 + 1 1										
2 + 1 ×	OVILLO/COTOTAL OUL ORINATED VOCOL/coth									
1 + 1 +	OV UG/KG TOTAL CHLORINATED VOCS  (so_sb)									
		•	o							
	=		Statistics			10				
	Total Number of Observations		Ŋ	Number of Disting						
	Tolerance Factor	N/A		Number of	Missing Values	100				
	Warning: This data set only has 0 observations!									
3 * * *	Data set is too small to compute reliable and meaningful statistics and estimates!									
1 + + 1	The data set for variable OV UG/KG TOTAL CHLORINATED VOCS  (so_sb) was not processed!									
3 + 1 X										
	It is suggested to collect at least 8 to	10 obser	vations before using	these statistical	methods!					
2 * * *	If possible, compute and collect Data Qual	ity Objecti	ves (DQO) based sa	mple size and a	nalytical result	s.				
3 + 1 1				-						
3 + 1 1										
2 0 1 1										
2 + 1 1	OV UG/KG TOTAL CHLORINATED VOCS  (so_ss)									
1 + 1 1										
2 * 1 *		General	Statistics							
1 + 1 1	Number of Valid Data			Number of	Detected Data	0				
3 * 1 X	Number of Distinct Detected Data				on-Detect Data					
1 * * *	Number of Distinct Detected Data	U		Number of N	OII-Detect Date	1 40				
	Warning: All observations are Non-Detects	(NDs) +b-	refere all statistics o	nd petimetes abo	auld also be Mi	Del				
2 * * 1	Specifically, sample mean, UCLs, UPLs, and									
1 + + 1										
3 0 0 7	The Project Team may decide to use alternative site	specific v	alues to estimate en	vironmentai para	imeters (e.g., i	EPC, BIV)				
3 0 4 4	The date and for undated OVILLO/ICOLT	OTAL OU	LODINATED VOCAL	()						
1 + + +	The data set for variable OV UG/KG T	OTAL CH	LORINATED VOCS	(so_ss) was not	processeu!					
2 * * *										
1 * * 1										
	PEST/PCB UG/KG 4,4'-DDD  (br_na)									
			Statistics			T_				
	Total Number of Observations		Ŋ	Number of Disting						
	Tolerance Factor	N/A		Number of	Missing Values	30				
1 + 1 +										
3 + 3 +			only has 0 observation							
1 + 1 +	Data set is too small to compu									
1 + 1 1	The data set for variable PEST	/PCB UG/	KG 4,4'-DDD  (br_na)	) was not proces	sed!					
1 + 1 ×										
1 + 1 +	It is suggested to collect at least 8 to	10 obser	vations before using	these statistical	methods!					
	If possible, compute and collect Data Qual	ity Objecti	ves (DQO) based sa	mple size and a	nalytical result	s.				
1 + 1 1										
1 + 1 1										
2 0 1 1	PEST/PCB UG/KG 4,4'-DDD  (so_sb)									
	· · · · · · · · · · · · · · · · · · ·									
2 * * *		General	Statistics							
1 + 1 1	Total Number of Observations			Number of Disting	ct Observations	s 0				
1 + + ×	Tolerance Factor	N/A	-		Missing Values					
	. 5.5.555 . 40001		I			1				
2 * * 1	Warning: This	data set	only has 0 observation	nsl						
1 + + 1	Data set is too small to compu				itael					
2 * * 1	The data set for variable PEST									
	The data set for variable PEST/	r celud/i	וטטט- +,+ןטעט (אט_SD	, was not proces	33 <b>5</b> U!					
		40 - 1		41						
	It is suggested to collect at least 8 to									
	If possible, compute and collect Data Qual	ιτy Objecti	ves (DQO) based sa	mpie size and a	naiytical result	S.				
	PEST/PCB UG/KG 4,4'-DDD  (so_ss)									
			· · · · · · · · · · · · · · · · · · ·							

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1		General	Statistics					
	Number of Valid Data	40		Number of Detected Date				
	Number of Distinct Detected Data	0		Number of Non-Detect Date	ta 40			
	Warning: All observations are Non-Detects							
	Specifically, sample mean, UCLs, UPLs, and							
	The Project Team may decide to use alternative site	specific \	alues to estimate en	vironmentai parameters (e.g.,	EPC, BT			
	The data set for variable PEST	/DCBILIC/	KGIA A' DDDI (so. ss	) was not processed				
	The data set for variable FEST	<i>г</i> сырц.	KG 4,4 -DDD  (80_88	) was not processed:				
	PEST/PCB UG/KG 4,4'-DDE  (br_na)							
	. == ==							
	General Statistics							
* 1 1	Total Number of Observations	0	1	Number of Distinct Observation	ns 0			
	Tolerance Factor	N/A		Number of Missing Value	es 30			
. , .								
	<u> </u>		only has 0 observation					
	Data set is too small to compu							
	The data set for variable PEST	/PCB UG/	KG 4,4'-DDE  (br_na	) was not processed!				
. , ,	It is suggested to collect at least 0 to	. 10 abası	vetiene before veine	these statistical mathedal				
	It is suggested to collect at least 8 to If possible, compute and collect Data Qua				lte			
	ii possible, compute and collect Data Qua	iity Object	ves (DQO) based sa	imple size and analytical resu	113.			
	PEST/PCB UG/KG 4,4'-DDE  (so_sb)							
0 1 1		General	Statistics					
0 1 1	Total Number of Observations	0	1	Number of Distinct Observation	ns 0			
. 1 1	Tolerance Factor	N/A		Number of Missing Value	es 100			
0 1 1	Tolerance Factor	N/A		Number of Missing Value	es 100			
				-	es 100			
0 1 4	Warning: This	s data set	only has 0 observation	ons!	es 100			
0 1 1	Warning: This Data set is too small to compu	s data set	and meaningful stat	ons! stics and estimates!	es 100			
0 1 T	Warning: This	s data set	and meaningful stat	ons! stics and estimates!	es 100			
0 1 T	Warning: This  Data set is too small to compu  The data set for variable PEST	s data set ite reliable /PCB UG/	and meaningful stat KG 4,4'-DDE  (so_sb	ons! stics and estimates! ) was not processed!	as 100			
	Warning: This  Data set is too small to compu  The data set for variable PEST  It is suggested to collect at least 8 to	s data set ite reliable //PCB UG/	and meaningful stati KG 4,4'-DDE  (so_sb vations before using	ons! stics and estimates! ) was not processed! these statistical methods!				
0 1 1 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	Warning: This  Data set is too small to compu  The data set for variable PEST	s data set ite reliable //PCB UG/	and meaningful stati KG 4,4'-DDE  (so_sb vations before using	ons! stics and estimates! ) was not processed! these statistical methods!				
	Warning: This  Data set is too small to compu  The data set for variable PEST  It is suggested to collect at least 8 to	s data set ite reliable //PCB UG/	and meaningful stati KG 4,4'-DDE  (so_sb vations before using	ons! stics and estimates! ) was not processed! these statistical methods!				
	Warning: This  Data set is too small to compu  The data set for variable PEST  It is suggested to collect at least 8 to	s data set ite reliable //PCB UG/	and meaningful stati KG 4,4'-DDE  (so_sb vations before using	ons! stics and estimates! ) was not processed! these statistical methods!				
	Warning: This  Data set is too small to compu  The data set for variable PEST  It is suggested to collect at least 8 to	s data set ite reliable //PCB UG/	and meaningful stati KG 4,4'-DDE  (so_sb vations before using	ons! stics and estimates! ) was not processed! these statistical methods!				
	Warning: This Data set is too small to compu The data set for variable PEST  It is suggested to collect at least 8 to If possible, compute and collect Data Qua	s data set te reliable /PCB UG/ o 10 obser lity Object	and meaningful stat KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa	ons! stics and estimates! ) was not processed! these statistical methods!				
	Warning: This Data set is too small to compute the data set for variable PEST  It is suggested to collect at least 8 to lif possible, compute and collect Data Quate the period of the p	s data set te reliable /PCB UG/ o 10 obser lity Object	and meaningful stati KG 4,4'-DDE  (so_sb vations before using	ons! stics and estimates! ) was not processed! these statistical methods! mple size and analytical resu	Its.			
	Warning: This Data set is too small to compute the data set for variable PEST  It is suggested to collect at least 8 to lf possible, compute and collect Data Quate PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data	s data set tte reliable /PCB UG/ to 10 obser lity Object  General	and meaningful stat KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa	ons! stics and estimates! ) was not processed! these statistical methods! mple size and analytical resu	its.			
	Warning: This Data set is too small to compute the data set for variable PEST  It is suggested to collect at least 8 to lf possible, compute and collect Data Quate PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data	s data set tte reliable //PCB UG/ o 10 obser lity Object  General 40 6	and meaningful stat KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa	ons! stics and estimates! ) was not processed! these statistical methods! mple size and analytical resu  Number of Detected Data	its.			
	Warning: This Data set is too small to compute the data set for variable PEST  It is suggested to collect at least 8 to lf possible, compute and collect Data Quate PEST/PCB UG/KG 4,4'-DDE  (so_ss)  PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor	s data set tte reliable //PCB UG/ to 10 obser lity Object  General 40 6 1.69	and meaningful stat KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa	ons! stics and estimates! ) was not processed! these statistical methods! mple size and analytical resu	its.			
	Warning: This Data set is too small to compute the data set for variable PEST  It is suggested to collect at least 8 to lf possible, compute and collect Data Quate PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data	s data set tte reliable //PCB UG/ to 10 obser lity Object  General 40 6 1.69	and meaningful stat KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa	ons! stics and estimates! ) was not processed! these statistical methods! mple size and analytical resu  Number of Detected Data	its.			
	Warning: This Data set is too small to compute the data set for variable PEST  It is suggested to collect at least 8 to lf possible, compute and collect Data Quate PEST/PCB UG/KG 4,4'-DDE  (so_ss)  PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values	s data set tte reliable //PCB UG/ to 10 obser lity Object  General 40 6 1.69	and meaningful stati KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa Statistics	Number of Detected Dat Number of Non-Detect Percent Non-Detect	its.			
	Warning: This Data set is too small to compute the data set for variable PEST  It is suggested to collect at least 8 to lf possible, compute and collect Data Quate PEST/PCB UG/KG 4,4'-DDE  (so_ss)  PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics	General 40 6 1.69	and meaningful stati KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa Statistics	ns! stics and estimates! ) was not processed! these statistical methods! mple size and analytical resu  Number of Detected Dat Number of Non-Detect Dat Percent Non-Detect	ta 6 ta 34 ts 85.00%			
	Warning: This Data set is too small to compute The data set for variable PEST  It is suggested to collect at least 8 to If possible, compute and collect Data Quate PEST/PCB UG/KG 4,4'-DDE  (so_ss)  PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected	General 40 6 1.69 75	and meaningful stati KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa Statistics	ns! stics and estimates! ) was not processed! these statistical methods! mple size and analytical resu  Number of Detected Dat Number of Non-Detect Dat Percent Non-Detect g-transformed Statistics Minimum Detected	ta 6 ta 34 ts 85.00%			
	Warning: This Data set is too small to compute The data set for variable PEST  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected	General 40 6 1.69 75	and meaningful stati KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa Statistics	ns! stics and estimates! ) was not processed! these statistical methods! mple size and analytical resu  Number of Detected Dat Number of Non-Detect Dat Percent Non-Detect g-transformed Statistics Minimum Detected Maximum Detected	ta 6 a 34 as 85.00%			
	Warning: This Data set is too small to compute The data set for variable PEST  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected Mean of Detected	General 40 6 1.69 75	and meaningful stati KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa Statistics	ns! stics and estimates! ) was not processed! these statistical methods! mple size and analytical resu  Number of Detected Dat Number of Non-Detect Dat Percent Non-Detect g-transformed Statistics Minimum Detecte Maximum Detecte Mean of Detected	ta 6 ta 34 ts 85.00%			
	Warning: This Data set is too small to compute The data set for variable PEST  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected Mean of Detected SD of Detected	General 40 6 1.69 75	and meaningful stati KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa Statistics	Number of Detected Data Number of Non-Detect Percent Non-Detect Maximum Detected Maximum Detected SD of Detected SD of Detected SD of Detected  SD of Detected  Non-Detected SD of Detected SD of Detected SD of Detected SD of Detected SD of Detected SD of Detected	ta 6 a 34 at 85.00% at 3.761 at 2.807 at 0.751			
	Warning: This Data set is too small to compute The data set for variable PEST  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics Minimum Detected Maximum Detected Mean of Detected	General 40 6 1.69 75 5.4 43 20.57 14.08 3.4	and meaningful stati KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa Statistics	ns! stics and estimates! ) was not processed! these statistical methods! mple size and analytical resu  Number of Detected Dat Number of Non-Detect Dat Percent Non-Detect g-transformed Statistics Minimum Detecte Maximum Detecte Mean of Detected	ta 6 a 34 at 85.00% at 1.686 at 3.761 at 2.807 at 1.224			
	Warning: This Data set is too small to compute The data set for variable PEST  It is suggested to collect at least 8 to If possible, compute and collect Data Quant PEST/PCB UG/KG 4,4'-DDE  (so_ss)  PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	General 40 6 1.69 75 5.4 43 20.57 14.08 3.4	and meaningful stati KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa Statistics	number of Detected Data Percent Non-Detected Maximum Detected Maximum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Non-Detected Minimum Non-Detected	ta 6 a 34 at 85.00% at 1.686 at 3.761 at 2.807 at 1.224			
	Warning: This Data set is too small to compute The data set for variable PEST  It is suggested to collect at least 8 to If possible, compute and collect Data Quant PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect Maximum Non-Detect	General 40 6 1.69 75 5.4 43 20.57 14.08 3.4	and meaningful stati KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa  Statistics  Lo	Number of Detected Data Number of Non-Detect Percent Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect Maximum Non-Detect	ta 6 a 34 as 85.00% as 3.761 as 2.807 as 0.751 at 1.224			
	Warning: This Data set is too small to compute The data set for variable PEST  It is suggested to collect at least 8 to If possible, compute and collect Data Quant PEST/PCB UG/KG 4,4'-DDE  (so_ss)  PEST/PCB UG/KG 4,4'-DDE  (so_ss)  Number of Valid Data Number of Distinct Detected Data Tolerance Factor Number of Missing Values  Raw Statistics  Minimum Detected Maximum Detected Mean of Detected SD of Detected Minimum Non-Detect	General 40 6 1.69 75 5.4 43 20.57 14.08 3.4 6.2	and meaningful stati KG 4,4'-DDE  (so_sb vations before using ves (DQO) based sa  Statistics  Lo  Singl	number of Detected Data Percent Non-Detected Maximum Detected Maximum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Minimum Non-Detected Non-Detected Minimum Non-Detected	ta 6 ta 34 ts 85.00%  ed 1.686 ed 3.761 ed 2.807 ed 0.751 et 1.224 et 1.825			

	Warning: There	are only 6	Detected Values in this data						
			bootstrap may be performed on this data set						
	the resulting calculations	may not be	e reliable enough to draw conclusions						
	It is recommended to have 10-15 or mo	ore distinct	t observations for accurate and meaningful results.						
		Backgroui	ound Statistics						
	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Values Or						
	Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Test Statistic	0.98					
	5% Shapiro Wilk Critical Value		5% Shapiro Wilk Critical Value						
	Data appear Normal at 5% Significance Lev	/el	Data appear Lognormal at 5% Significance Le	evel					
	Assuming Normal Distribution		Assuming Lognormal Distribution						
	DL/2 Substitution Method		DL/2 Substitution Method						
		5.211	Mean (Log Scale)	1.197					
		8.254	SD (Log Scale)	0.741					
	95% UTL 90% Coverage		95% UTL 90% Coverage						
	95% UPL (t)		95% UPL (t)						
	90% Percentile (z) 95% Percentile (z)		90% Percentile (z) 95% Percentile (z)						
	99% Percentile (z)		99% Percentile (z)						
	00 /0 : 0 · 00 · 10 · 10 · 10 · 10 · 10 · 10		00 % ( 0.00.11.110 (2)						
	Maximum Likelihood Estimate(MLE) Method		Log ROS Method						
		26.52	Mean in Original Scale						
		11.96	SD in Original Scale						
	95% UTL with 90% Coverage	46.73	95% UTL with 90% Coverage 95% BCA UTL with 90% Coverage						
			95% Bootstrap (%) UTL with 90% Coverage						
	95% UPL (t)	46.92	95% UPL (t)						
	90% Percentile (z)	41.84	90% Percentile (z)	6.191					
	95% Percentile (z)		95% Percentile (z)						
	99% Percentile (z)	54.34	99% Percentile (z)	35.65					
	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values C	Only					
	k star (bias corrected)		Data appear Normal at 5% Significance Leve						
	Theta Star								
	nu star	16.08							
	4 D.T. (0) (1)	0.404	N						
_	A-D Test Statistic 5% A-D Critical Value		Nonparametric Statistics  Kaplan-Meier (KM) Method						
	K-S Test Statistic		Mean	7 675					
	5% K-S Critical Value			7.356					
	Data appear Gamma Distributed at 5% Significan	ce Level	SE of Mean						
			95% KM UTL with 90% Coverage						
	Assuming Gamma Distribution		95% KM Chebyshev UPL 95% KM UPL (t)						
	Gamma ROS Statistics with Extrapolated Data Mean	3.085	90% Percentile (z)						
	Median		95% Percentile (z)						
		8.985	99% Percentile (z)						
	SD	0.0707							
	k star		Gamma ROS Limits with Extrapolated Data	9					
	k star Theta star	38.68							
	k star Theta star Nu star	38.68 6.38	95% Wilson Hilferty (WH) Approx. Gamma UPL	8.668					
	k star Theta star	38.68 6.38	95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL	8.668 6.521					
	k star Theta star Nu star	38.68 6.38 0.927	95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL 95% WH Approx. Gamma UTL with 90% Coverage	8.668 6.521 8.473					
	k star Theta star Nu star 95% Percentile of Chisquare (2k)	38.68 6.38 0.927 7.3	95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL	8.668 6.521 8.473					

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1 1 0	PEST/PCI	B UG/KG	4,4'-DDT  (	(br_na)								
	ļ						<u> </u>					
	1						Statistics					-
			Total Nur	mber of Ob				1		Distinct Ob		
				l olerar	nce Factor	N/A			Num	ber of Miss	ing Values	30
1 1 4				\A/a	rning. Thi	o doto oot	anhi haa A	oboon/otic	nol			
1 1 1			Data cot				only has 0			actimatecl		
		Data set is too small to compute reliable and meaningful statistics and estimates!  The data set for variable PEST/PCB UG/KG 4,4'-DDT  (br_na) was not processed!										
1 1 4	The data set for variable PEST/PCb[OG/RG[4,4-DDT] (bl_fla) was not processed:											
	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
1 1 1	It is suggested to collect at least o to 10 observations before using these statistical methods:  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.								3.			
1 1 1												
	PEST/PCB UG/KG 4,4'-DDT  (so_sb)											
, , ,												
1 1 3							Statistics					
			Total Nur	mber of Ob		_		1		Distinct Ob		-
				Tolerar	nce Factor	N/A			Num	ber of Miss	ing Values	100
				147								
1 1 1			D-1				only has 0			4!41		
				is too smal							1	
			The data s	set for varia	able PES I	/РСБІОС/	NG 4,4°-DL	מא_סא) ווכ	) was not	processea		
		lt io	suggested	to collect (	at loost 9 t	o 10 obsor	votione he	foro ucina	those stat	ictical mot	nodol	
1 1 3			, compute a									,
		i possible,	, compute a	aria collect	Data Qua	iity Objecti	טאַטן פּפּע	) baseu sa	ilibie size	and analyt	icai result	<b>).</b>
1 1 4												
1 4 0												
1 4 6	PEST/PCI	B UG/KG	4,4'-DDT  (	(so_ss)								
1 4 6	PEST/PCI	B UG/KG	4,4'-DDT  (	(so_ss)								
1 4 9	PEST/PCI	B UG/KG	4,4'-DDT  (	(so_ss)		General	Statistics					
1 4 0	PEST/PCI	B UG/KG		(so_ss)	Valid Data		Statistics		Num	nber of Dete	ected Data	5
1 4 1	PEST/PCI			Number of		40	Statistics			nber of Dete er of Non-D		
1 * * * * * * * * * * * * * * * * * * *	PEST/PCI		1	Number of bistinct Dete		40 5	Statistics		Numbe		etect Data	35
1 * * * * * * * * * * * * * * * * * * *	PEST/PCI		l umber of D	Number of bistinct Dete	ected Data nce Factor	40 5 1.69	Statistics		Numbe	er of Non-D	etect Data	35
	PEST/PCI		t umber of D Numb	Number of vistinct Dete Tolerar per of Missi	ected Data nce Factor	40 5 1.69	Statistics		Numbe	er of Non-D Percent No	etect Data on-Detects	35
	PEST/PCI		t umber of D Numb	Number of Vistinct Dete Tolerar per of Missi	ected Data nce Factor ing Values	40 5 1.69 75	Statistics	Lo	Numbe	er of Non-D Percent No med Statis	etect Data on-Detects tics	35 87.50%
	PEST/PCI		t umber of D Numb	Number of Distinct Determiner of Missington	ected Data nce Factor ing Values	40 5 1.69 75	Statistics	Lo	Numbe	er of Non-D Percent No med Statis Minimun	etect Data on-Detects tics	35 87.50%
	PEST/PCI		t umber of D Numb	Number of distinct Detection Tolerar oper of Missintatistics  Minimum Maximum	ected Data nce Factor ing Values n Detected	40 5 1.69 75 3.6 23	Statistics	Lo	Numbe	er of Non-D Percent No med Statis Minimun Maximun	etect Data on-Detects tics n Detected	35 87.50% 1.281 3.135
	PEST/PCI		t umber of D Numb	Number of distinct Detection Tolerar oper of Missintatistics  Minimum Maximum Mean of	ected Data nce Factor ing Values n Detected n Detected f Detected	40 5 1.69 75 3.6 23 11.34	Statistics	Lo	Numbe	er of Non-D Percent No med Statis Minimun Maximun Mean o	etect Data on-Detects  tics n Detected n Detected f Detected	35 87.50% 1.281 3.135 2.21
	PEST/PCI		umber of D Numb	Number of distinct Determiner of Missincer of Missincer of Missincer Minimum Maximum Mean of SD of the distinct of the state of the sta	ected Data nce Factor ing Values n Detected n Detected f Detected f Detected	40 5 1.69 75 3.6 23 11.34 8.04	Statistics	Lo	Numbe	med Statis Minimun Maximun Mean o	tics Detected Detected Detected Detected Detected Detected Detected Detected Detected	35 87.50% 1.281 3.135 2.21 0.755
	PEST/PCI		umber of D Numb	Number of distinct Determiner of Missincer of Missincer Minimum Maximum Mean of SD of Minimum N	ected Data nce Factor ing Values n Detected n Detected f Detected f Detected lon-Detect	3.6 23 11.34 8.04 4.5	Statistics	Lo	Numbe	med Statis  Minimun  Maximun  Mean o  SD o  Minimum  Minimum	tics n Detected n Detected f Detected f Detected for Detected for Detected for Detected for Detected for Detected for Detected for Detected	35 87.50% 1.281 3.135 2.21 0.755 1.504
	PEST/PCI		umber of D Numb	Number of distinct Determiner of Missincer of Missincer of Missincer Minimum Maximum Mean of SD of the distinct of the state of the sta	ected Data nce Factor ing Values n Detected n Detected f Detected f Detected lon-Detect	3.6 23 11.34 8.04 4.5	Statistics	Lo	Numbe	med Statis Minimun Maximun Mean o	tics n Detected n Detected f Detected f Detected for Detected for Detected for Detected for Detected for Detected for Detected for Detected	35 87.50% 1.281 3.135 2.21 0.755 1.504
	PEST/PCI	N	umber of D  Numb  Raw St	Number of distinct Dete Toleran per of Missi tatistics Minimum Maximum Mean o SD o Minimum Naximum Naximum Naximum Naximum Naximum Naximum Naximum Naximum Naximum Naximum Naximum Naximum Naximum Naximum Naximum Naximum N	nce Factor ing Values in Detected in Detected f Detected f Detected f Detected lon-Detect	3.6 23 11.34 8.04 4.5	Statistics		Numbe	med Statis  Minimun  Maximun  Mean o  SD o  Minimum N  Maximum N	tics n Detected n Detected f Detected f Detected lon-Detect lon-Detect	35 87.50% 1.281 3.135 2.21 0.755 1.504
		N Data w	number of D Numb Raw Si	Number of Distinct Detection of Missinger of	n Detected f Detected f Detected fon-Detect	3.6 23 11.34 8.04 4.5 6.2		Singl	Number   Num	med Statis  Minimun  Maximun  Mean o  SD o  Minimum N  Maximum N  Maximum N	tics n Detected n Detected f Detected f Detected flon-Detect lon-Detect	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825
	Note: Data	N  Data was have mul	Number of D  Raw St  with Multiple tiple DLs -	Number of distinct Detection Toleran Detection Missing Maximum Maximum Number of Maximum Number Detection Use of KM	n Detected n Detected n Detected f Detected non-Detect	3.6 23 11.34 8.04 4.5 6.2	Nui	Singl mber treate	Number g-transform !  Defection is a second control of the control	med Statis  Minimun  Maximun  Mean o  SD o  Minimum N  Maximum N  Maximum N	tics n Detected n Detected f Detected lon-Detect lon-Detect lon-Detect senario Single DL	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825
	Note: Data	Data was have multhods (exc	Number of D  Raw St  with Multiple tiple DLs - l ept KM, DL	Number of distinct Detection Toleran Deer of Missing Maximum Mean of SD of Minimum Number of Maximum Number Detection Use of KM 1/2, and RO	n Detected n Detected n Detected f Detected non-Detect	3.6 23 11.34 8.04 4.5 6.2	Nui	Singl mber treate Number tre	g-transform  !  de Detection ed as Non- ated as De	med Statis  Minimun  Maximun  Mean o  SD o  Minimum N  Maximum N  Maximum N  Maximum N  Maximum N  Maximum N  Maximum N  Maximum N	tics n Detected n Detected f Detected lon-Detect lon-Detect single DL Single DL	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825
	Note: Data	Data was have multhods (exc	Number of D  Raw St  with Multiple tiple DLs -	Number of distinct Detection Toleran Deer of Missing Maximum Mean of SD of Minimum Number of Maximum Number Detection Use of KM 1/2, and RO	n Detected n Detected n Detected f Detected non-Detect	3.6 23 11.34 8.04 4.5 6.2	Nui	Singl mber treate Number tre	g-transform  !  de Detection ed as Non- ated as De	med Statis  Minimun  Maximun  Mean o  SD o  Minimum N  Maximum N  Maximum N	tics n Detected n Detected f Detected lon-Detect lon-Detect single DL Single DL	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825
	Note: Data	Data was have multhods (exc	Number of D  Raw St  with Multiple tiple DLs - l ept KM, DL	Number of distinct Detection Toleran Deer of Missing Maximum Mean of SD of Minimum Number of Maximum Number Detection Use of KM 1/2, and RO	n Detected n Detected n Detected f Detected non-Detect	3.6 23 11.34 8.04 4.5 6.2	Nui	Singl mber treate Number tre	g-transform  !  de Detection ed as Non- ated as De	med Statis  Minimun  Maximun  Mean o  SD o  Minimum N  Maximum N  Maximum N  Maximum N  Maximum N  Maximum N  Maximum N  Maximum N	tics n Detected n Detected f Detected lon-Detect lon-Detect single DL Single DL	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825
	Note: Data	Data was have multhods (exc	Number of D  Raw St  with Multiple tiple DLs - l ept KM, DL	Number of distinct Detection Tolerander of Missinger of Missinger of Missinger of Missinger of Minimum Mean of SD of Minimum Near of Minimum Near of KM 1/2, and RO treated as	n Detected n Detected n Detected n Detected n Detected n Detected n Detected n Limits  Method is NDs	3.6 23 11.34 8.04 4.5 6.2	Nui	Singl mber treate Number tre Si	g-transform  [e Detection ed as Non- ated as De ngle DL No	med Statis  Minimun  Maximun  Mean o  SD o  Minimum N  Maximum N  Maximum N  Maximum N  Maximum N  Maximum N  Maximum N  Maximum N	tics n Detected n Detected f Detected lon-Detect lon-Detect single DL Single DL	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825
	Note: Data	Data van have multhods (excons < Larg	Number of D  Numbe	Number of distinct Detection Tolerar Deer of Missing Maximum Maximum Number of SD of Minimum Number Detection Use of KM 1/2, and RO treated as	n Detected n Detected n Detected f Detected non-Detect non-Detect n Limits  Method is NDs  There :	3.6 23 11.34 8.04 4.5 6.2 recommens),	Nui Nui Nui	Singl mber treate Number tre Si /alues in tl	g-transform  g-transform  [e Detection ed as Non- ated as De ngle DL No	med Statis Minimum Maximum Mean o SD o Minimum N Maximum N Maximum N Maximum N Maximum N Maximum N Maximum N Detect with etected with on-Detect F	tics n Detected n Detected f Detected lon-Detect lon-Detect single DL cercentage	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825
	Note: Data	Data van have multhods (excons < Larg	Number of D  Number of D  Number of D  Number of D  Number of D  Number of D  Number of D	Number of distinct Detection Tolerar Deer of Missing Maximum Maximum Number of SD of Minimum Number Detection Use of KM 1/2, and RO treated as	n Detected n Detected n Detected f Detected non-Detect non-Detect n Limits  Method is S Methods NDs  g: There and that every non-part of the text non-part n	3.6 23 11.34 8.04 4.5 6.2 recommens),	Nui Nui Nui Nui Nui Nui Nui Nui Nui Nui	Singl mber treate Number tre Si /alues in that	g-transform  general education	med Statis  Minimun  Maximun  Mean o  SD o  Minimum  Maximum  Maximum  Maximum  Maximum  Maximum  The complete of the complete	tics n Detected n Detected f Detected lon-Detect lon-Detect single DL cercentage	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825
	Note: Data	Data van have multhods (excons < Larg	Number of D  Number of D  Number of D  Number of D  Number of D  Number of D  Number of D	Number of distinct Detection Tolerar Detection Missistatistics  Minimum Maximum Mean of SD of Minimum Number of KM 1/2, and RO treated as  Warnin uld be noted	n Detected n Detected n Detected f Detected non-Detect non-Detect n Limits  Method is S Methods NDs  g: There and that every non-part of the text non-part n	3.6 23 11.34 8.04 4.5 6.2 recommens),	Nui Nui Nui Nui Nui Nui Nui Nui Nui Nui	Singl mber treate Number tre Si /alues in that	g-transform  general education	med Statis  Minimun  Maximun  Mean o  SD o  Minimum  Maximum  Maximum  Maximum  Maximum  Maximum  The complete of the complete	tics n Detected n Detected f Detected lon-Detect lon-Detect single DL cercentage	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825
	Note: Data	Data va have multhods (excons < Larg	Number of D  Number of D  Number of D  Number of D  Number of D  Number of D  Number of D	Number of distinct Determiner of Missincer of Missincer of Missincer of Missincer of Minimum Maximum Number of KM 1/2, and RO treated as Warninguld be note esulting cal	n Detected n Detected n Detected n Detected n Detected non-Detect n Limits Method is S Methods NDs  There is ed that ever coulations is considered to the second non-Detect non-	3.6 23 11.34 8.04 4.5 6.2 recommens),	Nui Nui Nui Poetected \	Singl mber treate Number tre Si /alues in that nay be per nough to d	g-transform  general services of the services	med Statis Minimum Maximum Mean o SD o Minimum N Maximum N Maximum N Maximum N Detect with etected with on-Detect F	tics n Detected n Detected n Detected lon-Detect lon-Detect lon-Detect single DL cercentage	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825
	Note: Data	Data va have multhods (excons < Larg	Number of D  Numbe	Number of distinct Determiner of Missincer of Missincer of Missincer of Missincer of Minimum Maximum Number of KM 1/2, and RO treated as Warninguld be note esulting cal	n Detected n Detected n Detected n Detected n Detected non-Detect n Limits Method is S Methods NDs  There is ed that ever coulations is considered to the second non-Detect non-	3.6 23 11.34 8.04 4.5 6.2 recommens),	Nui Nui Nui Poetected \	Singl mber treate Number tre Si /alues in that nay be per nough to d	g-transform  general services of the services	med Statis Minimum Maximum Mean o SD o Minimum N Maximum N Maximum N Maximum N Detect with etected with on-Detect F	tics n Detected n Detected n Detected lon-Detect lon-Detect lon-Detect single DL cercentage	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825
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	Note: Data For all met Observation	Data was have multhods (excons < Larg	Number of D  Numbe	Number of distinct Determiner of Missiner of Missiner of Missiner of Missiner of Minimum Mean of SD of Minimum Number of KM J/2, and RO treated as Warninguld be note osulting call to have 16	n Detected in Detected in Detected in Detected in Detected in Limits  Method is in Signature in Method is in Signature in Limits  There is in the individual	40 5 1.69 75 3.6 23 11.34 8.04 4.5 6.2 recommen s),	Detected \ Dootstrap re reliable er observation	Single mber treate Number tre Si Values in the nay be per nough to do nos for acces	g-transform  ge Detection  ed as Non- ated as De ngle DL No  nis data formed on raw conclu-	med Statis Minimum Maximum Mean o SD o Minimum N Maximum N Maximum N Maximum N Detect with etected with on-Detect F	tics n Detected n Detected f Detected Ion-Detect Ion-Detect Single DL Single DL Percentage	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825 37 3 92.50%
	Note: Data For all met Observation	Data was have multhods (excons < Larg	Number of D  Numbe	Number of distinct Determiner of Missister of Missister of Missister of Missister of Minimum Mean of SD of Minimum Number of KM Maximum Number of KM Maximum Number of KM Maximum Number of KM Maximum Number of KM Maximum Number of KM Maximum Number of KM Maximum Number of KM Maximum Number of KM Maximum Number of KM Maximum Number of KM Maximum Number of Maximum Number of Maximum Number of Numb	ected Data nce Factor ing Values  n Detected n Detected f Detected fon-Detect ion-Detect	40 5 1.69 75 3.6 23 11.34 8.04 4.5 6.2 recommen s), are only 5 en though I may not be bre distinct Backgroun Only 0.917	Detected \ Dootstrap re reliable er observation	Single mber treate Number tre Si Values in the nay be per nough to do nos for acces	g-transform  general services of the property	med Statis  Minimum  Maximum  Mean o  SD o  Minimum N  Maximum N  Maximum N  The Limit Sco  Detect with etected with on-Detect F  This data s  usions  meaningfu	tics n Detected n Detected n Detected f Detected lon-Detect lon-Detect single DL ercentage  set I results.	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825 37 3 92.50%
	Note: Data For all met Observation	Data was have multhods (excons < Larg	Number of D  Numbe	Number of distinct Determiner of Missi tetistics  Minimum Maximum Mean of SD of Minimum Numarimu	ected Data nce Factor ing Values  n Detected n Detected f Detected fon-Detect ion-Detect	40 5 1.69 75 3.6 23 11.34 8.04 4.5 6.2 recommen s), are only 5 en though I may not be bre distinct Backgroun Only 0.917	Detected \ Dootstrap re reliable er observation	Single mber treate Number tre Si Values in the nay be per nough to do nos for acces	g-transform  ge Detection  ed as Non- ated as De nis data formed on raw conclu- curate and  bution Tes  Shap	med Statis Minimum Maximum Mean o SD o Minimum N Maximum N Maximum N Maximum N  In Limit Sco Detect with etected with on-Detect F  I this data s usions	tics n Detected n Detected n Detected f Detected lon-Detect lon-Detect single DL ercentage  set I results.	35 87.50% 1.281 3.135 2.21 0.755 1.504 1.825 37 3 92.50%

	Data appear Normal at 5% Significance Lev	 	Data appear Lognormal at 5% Significance Le	avel
	Data appear Normal at 5% Significance Lev	/ei	Data appear Lognormal at 5% Significance Le	evei
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	DL/2 Substitution Method		DL/2 Substitution Method	
* 1		3.626	Mean (Log Scale)	1.085
	SD	3.921	SD (Log Scale)	0.498
	95% UTL 90% Coverage	10.25	95% UTL 90% Coverage	6.858
	95% UPL (t)	10.31	95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
* 1	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)	12.75	99% Percentile (z)	9.413
	Maximum Likelihood Estimate(MLE) Method	47.00	Log ROS Method	1 100
* 1		17.23	Mean in Original Scale	
		5.921	SD in Original Scale	
	95% UTL with 90% Coverage	21.23	95% UTL with 90% Coverage 95% BCA UTL with 90% Coverage	
			95% Bootstrap (%) UTL with 90% Coverage	
	95% UPL (t)	27 22	95% Bootstrap (%) OTE with 90% Coverage 95% UPL (t)	
1 1	95% OPL (t) 90% Percentile (z)		90% Percentile (z)	
1 7	95% Percentile (z)		95% Percentile (z)	
	99% Percentile (z)		99% Percentile (z)	
	33 % 1 3136Hule (2)	10.	33701 Groenule (2)	. 0.00
	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values C	Only
1 1	k star (bias corrected)		Data appear Normal at 5% Significance Leve	
	Theta Star	10.19		
	nu star	11.12		
1 0				
3 1	A-D Test Statistic	0.237	Nonparametric Statistics	
3 3	5% A-D Critical Value		Kaplan-Meier (KM) Method	
7 7	K-S Test Statistic		Mean	
, ,	5% K-S Critical Value			3.608
	Data appear Gamma Distributed at 5% Significan	ce Level	SE of Mean	
7 1	A 1 0 Bi i i i		95% KM UTL with 90% Coverage	
	Assuming Gamma Distribution	I	95% KM Chebyshev UPL	
1 4	Gamma ROS Statistics with Extrapolated Data Mean		95% KM UPL (t) 90% Percentile (z)	
	Median		95% Percentile (z)	
1 1		4.819	99% Percentile (z)	
1 1		0.184	33 % F ercentile (2)	12.30
1 1	Theta star		Gamma ROS Limits with Extrapolated Data	a
	Nu star		95% Wilson Hilferty (WH) Approx. Gamma UPL	
1 1	95% Percentile of Chisquare (2k)		95% Hawkins Wixley (HW) Approx. Gamma UPL	
1 *	,		95% WH Approx. Gamma UTL with 90% Coverage	
1 1	90% Percentile	12.92	95% HW Approx. Gamma UTL with 90% Coverage	
3 ×	95% Percentile			
1 0	99% Percentile	49.41		
	Note: DL/2 is not a recommended method.			
	Note. DD2 is not a recommended method.			
	PEST/PCB UG/KG ALDRIN  (br_na)			
		General	Statistics	
			Statistics  Number of Distinct Observations	0
e 3	PEST/PCB UG/KG ALDRIN  (br_na)			
e 3	PEST/PCB UG/KG ALDRIN  (br_na)  Total Number of Observations	0	Number of Distinct Observations	
e 3	PEST/PCB UG/KG ALDRIN  (br_na)  Total Number of Observations  Tolerance Factor	0 N/A	Number of Distinct Observations Number of Missing Values	
	PEST/PCB UG/KG ALDRIN  (br_na)  Total Number of Observations  Tolerance Factor  Warning: This	0 N/A	Number of Distinct Observations Number of Missing Values only has 0 observations!	
	PEST/PCB UG/KG ALDRIN  (br_na)  Total Number of Observations Tolerance Factor  Warning: This	0 N/A s data set	Number of Distinct Observations Number of Missing Values only has 0 observations! a and meaningful statistics and estimates!	
	PEST/PCB UG/KG ALDRIN  (br_na)  Total Number of Observations Tolerance Factor  Warning: This	0 N/A s data set	Number of Distinct Observations Number of Missing Values only has 0 observations!	
	PEST/PCB UG/KG ALDRIN  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu	N/A  s data set ute reliable	Number of Distinct Observations Number of Missing Values only has 0 observations! a and meaningful statistics and estimates!	

	Y		e		'	1		,
-								
	PEST/PCB UG/KG ALDRIN  (so_sb)							
	1 LOTH ODJOGHRAJI (LDININI (CO_CD)							
1 1		General	Statistics					
	Total Number of Observations			N		Distinct Obs		
	Tolerance Factor	N/A			Numb	er of Missi	ng Values	100
4 1	Warning: This	data set	only has 0 c	heervatio	nel			
. ,	Data set is too small to compu					stimates!		
	The data set for variable PEST							
,	It is suggested to collect at least 8 to							-
,	If possible, compute and collect Data Qual	ity Objecti	ves (DQO)	based sai	npie size a	and analytic	cai resuits	i.
,	PEST/PCB UG/KG ALDRIN  (so_ss)							
*		00=0=-	Otati-ti					
-	Number of Valid Data		Statistics		Num	ber of Dete	cted Data	0
	Number of Distinct Detected Data					r of Non-De		
. ,	Warning: All observations are Non-Detects							
	Specifically, sample mean, UCLs, UPLs, and							
	The Project Team may decide to use alternative site	specific v	alues to es	timate env	rironmenta	il paramete	rs (e.g., E	PC, B1
	The data set for variable PEST	/PCBIUG/	KGIAI DRII	di (so ss)	was not n	rocessedi		
- 1	The data conton variable ( Ec.	71 OD OG/	rap test til	<u> </u>	mao not p			
	PEST/PCB UG/KG ALPHA-BHC  (br_na)							
* 1		General	Statistics					
	Total Number of Observations	0		N		Distinct Obs		
	Tolerance Factor	N/A			Numb	er of Missi	ng Values	30
	Warning: This	data set	anly has 0 c	hservatio	nel			
- e - 1	Warning: This Data set is too small to compu					stimates!		
	Warning: This  Data set is too small to comput  The data set for variable PEST/P	te reliable	and meani	ngful statis	stics and e		11	
s c	Data set is too small to compute The data set for variable PEST/P	te reliable CB UG/K0	and meani G ALPHA-B	ngful statis HC  (br_n	stics and e a) was not	processed		
	Data set is too small to compute The data set for variable PEST/P	te reliable CB UG/K0	and meaning and me	ngful statis HC  (br_n ore using	stics and e a) was not these stati	processed	ods!	
	Data set is too small to compute The data set for variable PEST/P	te reliable CB UG/K0	and meaning and me	ngful statis HC  (br_n ore using	stics and e a) was not these stati	processed	ods!	).
# T	Data set is too small to compute The data set for variable PEST/P	te reliable CB UG/K0	and meaning and me	ngful statis HC  (br_n ore using	stics and e a) was not these stati	processed	ods!	).
	Data set is too small to compute The data set for variable PEST/P	te reliable CB UG/K0	and meaning and me	ngful statis HC  (br_n ore using	stics and e a) was not these stati	processed	ods!	3.
* * * * * * * * * * * * * * * * * * *	Data set is too small to compute The data set for variable PEST/P	te reliable CB UG/K0	and meaning and me	ngful statis HC  (br_n ore using	stics and e a) was not these stati	processed	ods!	S
* * * * * * * * * * * * * * * * * * *	Data set is too small to compute The data set for variable PEST/P  It is suggested to collect at least 8 to least 8 to least 8 to least 8 to least 8 to least 8 to least 8 to least 8 to least 8 to least 8 to least 8 to le	te reliable CB UG/K0 o 10 obser ity Objecti	and meaning and me	ngful statis HC  (br_n ore using	stics and e a) was not these stati	processed	ods!	3.
	Data set is too small to comput The data set for variable PEST/P  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  PEST/PCB UG/KG ALPHA-BHC  (so_sb)	te reliable CB UG/K0  10 obser ity Objecti  General	and meaning and me	ngful statis HC  (br_n ore using t based sai	stics and e a) was not these stati mple size a	t processed stical meth and analytic	ods! cal results	
	Data set is too small to comput The data set for variable PEST/P  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  PEST/PCB UG/KG ALPHA-BHC  (so_sb)  Total Number of Observations	te reliable CB UG/K0  10 obser ity Objecti  General	and meaning and me	ngful statis HC  (br_n ore using t based sai	stics and e a) was not these stati mple size a	stical methand analytic	ods! cal results	0
	Data set is too small to comput The data set for variable PEST/P  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  PEST/PCB UG/KG ALPHA-BHC  (so_sb)	te reliable CB UG/K0  10 obser ity Objecti  General	and meaning and me	ngful statis HC  (br_n ore using t based sai	stics and e a) was not these stati mple size a	t processed stical meth and analytic	ods! cal results	0
	Data set is too small to comput The data set for variable PEST/P  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  PEST/PCB UG/KG ALPHA-BHC  (so_sb)  Total Number of Observations Tolerance Factor	te reliable CB UG/K0 0 10 obser ity Objecti  General 0 N/A	and meaning and meaning and meaning and meaning and	ngful statis HC  (br_n  ore using to based sai	stics and e a) was not these stati mple size a	stical methand analytic	ods! cal results	0
	Data set is too small to comput The data set for variable PEST/P  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  PEST/PCB UG/KG ALPHA-BHC  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This	te reliable CB UG/K0 0 10 obser ity Objecti  General 0 N/A	and meaning Alberta and meaning Alberta and meaning Alberta and Market and Market Alberta	ngful statis HC  (br_n  ore using the based sain  N  observatio	stics and e a) was not these stati mple size a	stical meth and analytic Distinct Obser of Missin	ods! cal results	0
	Data set is too small to comput The data set for variable PEST/P  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  PEST/PCB UG/KG ALPHA-BHC  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute	te reliable CB UG/K0 0 10 obser ity Objecti  General 0 N/A s data set of te reliable	and meaning and me	ngful statis HC  (br_n  ore using the based san  N  observation	stics and e a) was not these stati mple size a lumber of I Numb	stical methand analytic	ods! cal results servations ng Values	0
	Data set is too small to comput The data set for variable PEST/P  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  PEST/PCB UG/KG ALPHA-BHC  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This	te reliable CB UG/K0 0 10 obser ity Objecti  General 0 N/A s data set of te reliable	and meaning and me	ngful statis HC  (br_n  ore using the based san  N  observation	stics and e a) was not these stati mple size a lumber of I Numb	stical methand analytic	ods! cal results servations ng Values	0
	Data set is too small to comput The data set for variable PEST/P  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  PEST/PCB UG/KG ALPHA-BHC  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/Possible.	c data set of the reliable CB UG/K0	and meaning G ALPHA-B vations before (DQO)  Statistics  only has 0 columns and meaning G ALPHA-B	ngful statis HC  (br_n  ore using the based said  N  observation ngful statis HC  (so_s	stics and e a) was not these stati mple size a  lumber of I  Numb  ns! stics and e b) was not	stical methand analytic  Distinct Obser of Missin  estimates!	ods! cal results servations ng Values	0
	Data set is too small to comput The data set for variable PEST/P  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  PEST/PCB UG/KG ALPHA-BHC  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute	ce reliable CB UG/KC  o 10 obser ity Objecti  General  0  N/A  data set of the reliable CB UG/KC  o 10 obser	and meaning G ALPHA-B rvations before (DQO) Statistics only has 0 color and meaning G ALPHA-B rvations before the color of	ngful statis HC  (br_n  ore using the based said  N  observation ngful statis HC  (so_s  ore using the said	stics and e a) was not these stati mple size a lumber of I Numb ns! stics and e b) was not	stical methand analytic  Distinct Obser of Missinstimates!  t processed	ods! cal results servations ng Values d!	0 100

	v v	c n		h	e		,	1	E	r
* 2 3 1										
	PEST/PCB UG/KG	ALPHA-BHC  (so_ss)	1							
					Statistics					
* 1 1 *		Number of						ber of Dete		
* * 1 1	IN	lumber of Distinct Dete	ected Data	U			Numbe	er of Non-D	etect Data	40
x 2 2 x	\Morning, Al	II abaamiatiana ara Na	n Dotooto	/NIDa\ the	roforo all a	totiotico o	nd aatimat	oo obould a	oloo bo NF	and .
* * * *		ll observations are No ample mean, UCLs, l								
X 2 1 0		nay decide to use alte								
X 2 1 1	The Project realith	iay decide to use after	IIIauve Sitt	s specific v	alues to es	sumate em	VIIOIIIIGIIA	ai parailiet	ль ( <del>c</del> .y., с	.FC, B1V)
X 1 1 1	7	The data set for variab	le PEST/E	CBILIG/K	SIAI PHA-F	BHCI (so s	e) was no	t processe	dl	
X - Y - 1 - Y	•	THE GALLA COLLIG. TAILAD		05/00/10	ap (=: 1.17 t =	J. 10   (00_1	, was 110	p. 000000		
X 2 2 4										
* 1 1 1										
* 1 1 *	PEST/PCB UG/KG ALPHA-CHLORDANE  (br_na)									
* 1 1 1										
* 1 1 *				General	Statistics					
* 1 1 *		Total Number of Ob	servations	0		١	lumber of	Distinct Ob	servations	0
* 1 * *		Tolerar	nce Factor	N/A			Num	ber of Missi	ng Values	30
* 1 * 1										
X 7 1 1										
* * * *					only has 0					
* * * * *		Data set is too smal								
	The d	lata set for variable Pl	EST/PCB	UG/KG AL	PHA-CHLC	DRDANE	(br_na) wa	as not proc	essed!	
		suggested to collect a								
* * * *	If possible	, compute and collect	Data Qua	lity Objecti	ves (DQO)	) based sa	mple size	and analyt	cal results	•
* * * *										
* * * 1	DECT/DODING/KOI	ALDUA OULODDANI	-1 /aa ah)							
	PEST/PCB UG/KG	ALPHA-CHLORDANE	=  (SO_SD)							
* * * *				Conorol	Statistics					
* * * *		Total Number of Ob	sarvations		Statistics	N	Jumber of	Distinct Ob	servations	٥
* * * *			nce Factor	N/A		1		ber of Missi		-
X Y 1 1		Toloidi	ice i detei	14// (			Italii	DCI OI WIIOOI	iig values	100
* * * *										
X 7 1 +		Wa	rning: This	s data set	only has 0	observatio	ns!			
* 1 * *		Data set is too smal						estimates!		
* * * * *	The d	ata set for variable PE							essed!	
* 1 * 1										
* 7 * 7	It is	suggested to collect a	at least 8 to	o 10 obser	vations bef	fore using	these stat	istical meth	iods!	
* * * *	If possible	, compute and collect	Data Qua	lity Objecti	ves (DQO)	) based sa	mple size	and analyti	cal results	
* * * *										
	DE07/D0DU10///01									
* 1 * *	PEST/PCB UG/KG	ALPHA-CHLORDANE	=  (so_ss)							
* * 1 *				0 1	01-11-11-					
* * 2 1		N	V. P. I. D. I.		Statistics		N.1	(D. )		0
K 1 2 1	N.	Number of		_				ber of Dete		
* 1 1 1	IN	lumber of Distinct Dete			ambi 2 Data	t d \ / - l		er of Non-D	etect Data	3/
* * 3 *					only 3 Dete			ootimataa		
* 1 1 1		This is not enough to			ill be produ		นธนษร สกัด	esumates.	1	
* 1 1 *			INO S	เฉนอนปรี W	ııı n <del>a</del> htodu	iceu!				
* 1 1 1		Tolerar	nce Factor	1 69				Percent No	n-Detecto	92 50%
* 1 1 *		Number of Missi						i ercentino	11-0616012	JZ.JU /0
X 1 1 0		MAILING! OF MISSI	ing values	/ 5						
		Raw Statistics				١٨	g-transfor	med Statist	ics	
1			<u> </u>	2.0			g		n Detected	1.335
X 7 1 1		Minimum	) Detected	3.0						
* * * * *			Detected Detected						Detected	
K 1 K 1		Maximum	Detected	7				Maximum	Detected	1.946
* 7 * 1		Maximum Mean o		7 5.8				Maximum Mean o		1.946 1.723

#### Table 2 ProUCL Output

	y y c p 1		0	,
7 1 1	Minimum Non-Detect	1 2	Minimum Non-Detect	በ 588
	Maximum Non-Detect		Maximum Non-Detect	
F 1	Maximum Non Botos.	0.2	Maximum Non Botton	1.100
	Data with Multiple Detection Limits		Single Detection Limit Scenario	
	Note: Data have multiple DLs - Use of KM Method is	recommer		37
	For all methods (except KM, DL/2, and ROS Methods	s),	Number treated as Detected with Single DL	
	Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	92.50%
. 1			•	
* 1				
			ct Detected Values in this data set	
			ugh to perform GOF tests, bootstrap, and ROS meth	ods.
* 1	Those methods will r	eturn a 'N	/A' value on your output display!	
	lt in management to have A	D	istingt Values for heatstree matheds	
			istinct Values for bootstrap methods.  9 distinct values may not be reliable.	
			ons for accurate and meaningful results and estimate	26
	it is recommended to mave 10 to 13 of more	ODS-I Vali	ons for accurate and meaningful results and estimate	<i>5</i> 5.
. 1		Backgrour	nd Statistics	
* 1	Normal Distribution Test with Detected Values		Lognormal Distribution Test with Detected Value	s Only
	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
	5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	
	Data appear Normal at 5% Significance Lev	/el	Data appear Lognormal at 5% Significance Lognormal	evel
* 1				
	Assuming Normal Distribution		Assuming Lognormal Distribution	
	DL/2 Substitution Method		DL/2 Substitution Method	
	Mean		Mean (Log Scale)	
		1.272	SD (Log Scale)	
	95% UTL 90% Coverage		95% UTL 90% Coverage	
	95% UPL (t)		95% UPL (t)	
	90% Percentile (z)		90% Percentile (z)	
	95% Percentile (z)		95% Percentile (z)	
1 1	99% Percentile (z)	4.56	99% Percentile (z)	3.704
	Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
1 4		6.065	Mean in Original Scale	1.15
, ,		1.424	SD in Original Scale	
1 1	95% UTL with 90% Coverage	8.471	95% UTL with 90% Coverage	
1 1			95% BCA UTL with 90% Coverage	4.08
1 1			95% Bootstrap (%) UTL with 90% Coverage	
3 1	95% UPL (t)		95% UPL (t)	
1 1	90% Percentile (z)	7.89	90% Percentile (z)	2.328
	95% Percentile (z)		95% Percentile (z)	
1 1	99% Percentile (z)	9.377	99% Percentile (z)	6.078
1 0	Common Distribution Test with Datastad Values	Only	Data Dictails stick Took with Datastad Values (	<b>S</b> b
1 0	Gamma Distribution Test with Detected Values	N/A	Data Distribution Test with Detected Values (	
	k star (bias corrected) Theta Star	N/A	Data appear Normal at 5% Significance Lev	C1
1 1	nu star	N/A		
	ild Star	1		
	A-D Test Statistic	N/A	Nonparametric Statistics	I .
, ,	5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
1 4	K-S Test Statistic	N/A	Mean	3.95
1 1	5% K-S Critical Value	N/A	SD	0.655
) Y	Data not Gamma Distributed at 5% Significance	Level	SE of Mean	
			95% KM UTL with 90% Coverage	
	Assuming Gamma Distribution		95% KM Chebyshev UPL	
	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
	Mean	N/A	90% Percentile (z)	
	Median	N/A	95% Percentile (z)	
	SD	N/A	99% Percentile (z)	5.475
	k star	N/A	Commo DOC Limite with Enternal and Day	
* 1	Theta star	N/A N/A	Gamma ROS Limits with Extrapolated Dat 95% Wilson Hilferty (WH) Approx. Gamma UPL	1
	Nu star 95% Percentile of Chisquare (2k)	N/A N/A	95% Wilson Hilferty (WH) Approx. Gamma UPL 95% Hawkins Wixley (HW) Approx. Gamma UPL	N/A N/A
	1 95% Percentile of Chisquare (2K)	IN/A	3370 Hawkins Wixley (TW) Approx. Gariffia UPL	IN/A

			0 N 1 1 K	
			95% WH Approx. Gamma UTL with 90% Coverage	N/A
	90% Percentile	N/A	95% HW Approx. Gamma UTL with 90% Coverage	N/A
	95% Percentile	N/A	e e e e e e e e e e e e e e e e e e e	
* * * 1	99% Percentile	N/A		
	Note: DL/2 is not a recommended method.			
* * * 1	PEST/PCB UG/KG AROCLOR-1016  (br_na)			
			Statistics	
	Total Number of Observations		Number of Distinct Observations	
	Tolerance Factor	N/A	Number of Missing Values	30
			only has 0 observations!	
			and meaningful statistics and estimates!	
* * * 1	I ne data set for variable PEST/PCt	3 UG/KG	AROCLOR-1016  (br_na) was not processed!	
	lt is augrested to collect at least 0 to	10 abaa	vations before value these etatistical mathedal	
			vations before using these statistical methods!	
x + 3 +	it possible, compute and collect Data Quali	ity Object	ves (DQO) based sample size and analytical results.	
* * 1 1				
* * 1 1				
* * 1 1	DEST/DODING/VOIADOOLOD 10161 (co. ch)			
* * 2 *	PEST/PCB UG/KG AROCLOR-1016  (so_sb)			
* * : *		General	Statistics	
* * : *	Total Number of Observations		Number of Distinct Observations	n
* * 1 1	Tolerance Factor	N/A	Number of Missing Values	
* * 1 *	Tolerance Factor	IN/A	Number of Missing Values	100
x + 1 +				
	Warning: This	data set	only has 0 observations!	
* * * *			and meaningful statistics and estimates!	
x + + 1			AROCLOR-1016  (so_sb) was not processed!	
* * * *			1( = 7	
	It is suggested to collect at least 8 to	10 obsei	vations before using these statistical methods!	
			ves (DQO) based sample size and analytical results.	
* * * 1				
	PEST/PCB UG/KG AROCLOR-1016  (so_ss)			
		General	Statistics	
* * * 3	Number of Valid Data	40	Number of Detected Data	0
* * * *	Number of Distinct Detected Data	0	Number of Non-Detect Data	40
	-		refore all statistics and estimates should also be NDs	
			stics are also NDs lying below the largest detection li	
	The Project Team may decide to use alternative site	specific \	alues to estimate environmental parameters (e.g., El	PC, BTV)
	The data set for variable PEST/PCE	B UG/KG	AROCLOR-1016  (so_ss) was not processed!	
* * * *	DEST/DODILIO/KOLADOSI OD 1001///			
	PEST/PCB UG/KG AROCLOR-1221  (br_na)			
* + * +		O	Chatlatia	
	Takal National Color of the		Statistics	0
* * * 1	Total Number of Observations		Number of Distinct Observations	
	Tolerance Factor	N/A	Number of Missing Values	3U
	AAI a mada a a 1996 ta	dota and	anh, hao A ahaan,atianal	
			only has 0 observations!	
	⊔ata set is too smail to comput		and meaningful statistics and estimates!	
	The data ant for veriable DECT/DO		AROCLOR-1221  (br_na) was not processed!	

		r r
		ļļ
	It is suggested to collect at least 8 to 10 observations before using these statistical met	hodel
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy	
	in possible, compute and conect bata quality objectives (bqo) based sample size and arrange	ucai results.
* * * 1		
	DEST DODING (COLODO OD 4004) (see al.)	
* * 2 *	PEST/PCB UG/KG AROCLOR-1221  (so_sb)	
	General Statistics	
	Total Number of Observations 0 Number of Distinct Ob	
, .	Tolerance Factor N/A Number of Miss	sing Values 100
* * * *		
* * * *	Warning: This data set only has 0 observations!	
* * * 1	Data set is too small to compute reliable and meaningful statistics and estimates!	
* * * *	The data set for variable PEST/PCB UG/KG AROCLOR-1221  (so_sb) was not proces	ssed!
* * * *		
* * 1 *	It is suggested to collect at least 8 to 10 observations before using these statistical met	hods!
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy	
* * 1 1		
* * 1 1		
* * 1 *		
	PEST/PCB UG/KG AROCLOR-1221  (so_ss)	
X X 2 Y	1	
X X 1 1	General Statistics	
* * * *	Number of Valid Data 40 Number of Det	ected Data 0
X X X X	Number of Distinct Detected Data 0 Number of Non-L	
	Number of Distinct Setected Bala V	Detect Data 40
	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should	aleo he NDel
	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest	
	The Project Team may decide to use alternative site specific values to estimate environmental parameters.	
	The Project Team may decide to use alternative site specific values to estimate environmental parameter	ieis (e.g., EPC, DTV).
* * * *	The date and for variable DEST/DCDI/IC/ADOCI OD 1221/ (ac. ac) was not process	and!
	The data set for variable PEST/PCB UG/KG AROCLOR-1221  (so_ss) was not proces	iseu!
* * * 1		
	PEST/PCB UG/KG AROCLOR-1232  (br_na)	
	General Statistics	
	Total Number of Observations 0 Number of Distinct Observations	
	Tolerance Factor N/A Number of Miss	sing Values 30
* * * *	Warning: This data set only has 0 observations!	
	Data set is too small to compute reliable and meaningful statistics and estimates!	
1	The data set for variable PEST/PCB UG/KG AROCLOR-1232  (br_na) was not proces	
		sed!
* * * *		sed!
* * * *	It is suggested to collect at least 8 to 10 observations before using these statistical met	
* : : :	It is suggested to collect at least 8 to 10 observations before using these statistical met  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy-	hods!
T T T T T T T T T T T T T T T T T T T	It is suggested to collect at least 8 to 10 observations before using these statistical met  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy	hods!
		hods!
* * * *		hods!
* * * * * * * * * * * * * * * * * * *	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy	hods!
		hods!
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy  PEST/PCB UG/KG AROCLOR-1232  (so_sb)	hods!
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy  PEST/PCB UG/KG AROCLOR-1232  (so_sb)  General Statistics	hods! tical results.
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy  PEST/PCB UG/KG AROCLOR-1232  (so_sb)  General Statistics  Total Number of Observations 0 Number of Distinct Observations	hods! tical results.  oservations 0
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy  PEST/PCB UG/KG AROCLOR-1232  (so_sb)  General Statistics  Total Number of Observations 0 Number of Distinct Observations	hods! tical results.
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy  PEST/PCB UG/KG AROCLOR-1232  (so_sb)  General Statistics  Total Number of Observations 0 Number of Distinct Observations	hods! tical results.  oservations 0
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy  PEST/PCB UG/KG AROCLOR-1232  (so_sb)  General Statistics  Total Number of Observations 0 Number of Distinct Observations Tolerance Factor N/A Number of Miss	hods! tical results.  oservations 0
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy  PEST/PCB UG/KG AROCLOR-1232  (so_sb)  General Statistics  Total Number of Observations 0 Number of Distinct Observations N/A Number of Miss  Warning: This data set only has 0 observations!	hods! tical results.  pservations 0 sing Values 100
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy  PEST/PCB UG/KG AROCLOR-1232  (so_sb)  General Statistics  Total Number of Observations 0 Number of Distinct Observations N/A Number of Miss  Warning: This data set only has 0 observations!  Data set is too small to compute reliable and meaningful statistics and estimates!	hods! tical results.  pservations 0 sing Values 100
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy  PEST/PCB UG/KG AROCLOR-1232  (so_sb)  General Statistics  Total Number of Observations 0 Number of Distinct Observations N/A Number of Miss  Warning: This data set only has 0 observations!	hods! tical results.  pservations 0 sing Values 100
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analy  PEST/PCB UG/KG AROCLOR-1232  (so_sb)  General Statistics  Total Number of Observations 0 Number of Distinct Observations N/A Number of Miss  Warning: This data set only has 0 observations!  Data set is too small to compute reliable and meaningful statistics and estimates!	hods! tical results.  Deservations 0 sing Values 100  ssed!

		h.	q		1	1	ĸ	r
1 1	If possible, compute and collect Data Qual	ity Object	ives (DQO)	based sa	mple size	and analy	tical result	3.
	PEST/PCB UG/KG AROCLOR-1232  (so_ss)							
, ,								
	N. J. WEID		Statistics		N.			
	Number of Valid Data Number of Distinct Detected Data						tected Data Detect Data	
	Number of Distinct Detected Data	U			Numbe	er or ivon-i	Detect Data	40
	Warning: All observations are Non-Detects (	(NDs), the	erefore all s	tatistics ar	nd estimat	tes should	also be NI	Os!
	Specifically, sample mean, UCLs, UPLs, and o							
	The Project Team may decide to use alternative site							
	The data set for variable PEST/PC	3 UG/KG	AROCLOR	-1232  (so	_ss) was	not proces	ssed!	
1								
	PEST/PCB UG/KG AROCLOR-1242  (br na)							
*	( )							
1		General	Statistics					
	Total Number of Observations			N			bservations	
	Tolerance Factor	N/A			Num	ber of Mis	sing Values	30
. ,	Warning: This	data set	only has 0	oheenvatio	nel			
. 1	Data set is too small to compu					estimates		
	The data set for variable PEST/PCI							
						•		
*	It is suggested to collect at least 8 to	10 obsei	vations bef	fore using	these stat	tistical me	thods!	
* 1	If possible, compute and collect Data Qual	ity Object	ives (DQO)	based sa	mple size	and analy	tical result:	3.
	DEST/DODING/VCIADOCI OD 12421 (co. ch)							
	PEST/PCB UG/KG AROCLOR-1242  (so_sb)							
		General	Statistics					
	Total Number of Observations	0		N	lumber of	Distinct O	bservations	0
	Tolerance Factor	N/A			Num	ber of Mis	sing Values	100
								•
	Warning: This						•	
	Data set is too small to compu The data set for variable PEST/PCI							
	The data sector variable ( EST/) SE	S <sub>I</sub> O G/1(G <sub>I</sub>	, ii (OOLO) (	12-12  (60	_05) ***40	not prooc	500u.	
1 1	It is suggested to collect at least 8 to	10 obsei	vations bef	fore using	these stat	tistical me	thods!	
1	If possible, compute and collect Data Qual							S.
	DEST/DODING/KOIADOOLOD 4040/ ()							
	PEST/PCB UG/KG AROCLOR-1242  (so_ss)							
		General	Statistics					
	Number of Valid Data		- 121131100		Nun	nber of De	tected Data	0
	Number of Distinct Detected Data						Detect Data	
, ,			1					
	Warning: All observations are Non-Detects							
	Specifically, sample mean, UCLs, UPLs, and o							
	The Project Team may decide to use alternative site	specific \	alues to es	stimate en	vironment	al parame	ters (e.g., E	PC, BT
1 1	The data antiferrediable DECT/DO		ADOO! OF	104017-		not	20041	
	The data set for variable PEST/PCI	ojud/KG	AKUULUR	- ı∠4∠  (SO	_ss) was	not proces	ssea!	
	1							

	, , , , , , , , , , , , , , , , , , , ,	q			E	r
	PEST/PCB UG/KG AROCLOR-1248  (br_na)					
* * * 1	Gene	al Statistics				
* * * *	Total Number of Observations 0	di Ciationoo	N	umber of Distinct	Observations	0
* * * 1	Tolerance Factor N/A				lissing Values	
* * * *	'	"			-	
* * * :						
	Warning: This data s					
* * 1 *	Data set is too small to compute relial The data set for variable PEST/PCB UG/K					
* * * 1	The data set for variable 1 EST/1 Object/1	арапоосоп-	1240  (61_	ila) was not pro-	cesseui	
* 4 1 2	It is suggested to collect at least 8 to 10 obs	ervations befo	ore using t	hese statistical r	methods!	
* * * 1	If possible, compute and collect Data Quality Obje	ctives (DQO)	based san	nple size and an	alytical results	<b>3.</b>
* * * 1	PEST/PCB UG/KG AROCLOR-1248  (so_sb)					
* * * *	1. 2011 ODJOG/100 PULLODE OT 12 10 (00_00)					
* * * *	Gene	al Statistics				
x + + +	Total Number of Observations 0		N	umber of Distinct		_
* * * 1	Tolerance Factor N/A			Number of N	lissing Values	100
x + + 1						
* * * *	Warning: This data s	et only has 0 o	bservation	ns!		
* * * *	Data set is too small to compute relial	•			es!	
* * * *	The data set for variable PEST/PCB UG/K					
* 4 4 3						
	It is suggested to collect at least 8 to 10 ob					
x + 1 +	If possible, compute and collect Data Quality Obje	ctives (DQO)	based san	nple size and an	alytical results	) <b>.</b>
* * 3 1						
x 4 3 3						
X 4 3 7	PEST/PCB UG/KG AROCLOR-1248  (so_ss)					
* *						
* * 2 *	General Number of Valid Data 40	al Statistics		Ni mahar af i	Detected Data	0
x + 2 3	Number of Distinct Detected Data 0				n-Detect Data	
* 4 2 *	Hamber of Bistiffet Betested Batta			Trainber of tro	ii Detect Data	10
x + 1 +	Warning: All observations are Non-Detects (NDs),	herefore all st	atistics an	d estimates sho	uld also be NC	s!
* * * *	Specifically, sample mean, UCLs, UPLs, and other st					
* * * 1	The Project Team may decide to use alternative site specific	c values to est	timate env	ironmental parar	meters (e.g., E	PC, BTV).
* * * 1	The data set for variable PEST/PCB UG/K	CIADOCI OD	12491 (60	ce) was not pro	oossadi	
* * * *	The data set for variable FEST/FCB OG/N	ajANOCLON-	1240  (50_	_ss) was not pro	cesseu:	
* * * *						
	PEST/PCB UG/KG AROCLOR-1254  (br_na)					
	0	al Ctatletics				
	Total Number of Observations 0	al Statistics	NI	umber of Distinct	Ohservations	0
* * * 1	Total Number of Observations of Tolerance Factor N/A		IN		Missing Values	
* * * :	1 3.3.3.33 1 33.31					
X Y Y Y						
	Warning: This data s					
	Data set is too small to compute relia					
X Y 4 1	The data set for variable PEST/PCB UG/K	GIARUULUR-	-ı∠54  (Dr_	na) was not pro	cessea!	
	It is suggested to collect at least 8 to 10 obs	ervations befo	ore usina t	hese statistical r	nethods!	
	If possible, compute and collect Data Quality Obje					).
x 1 + +		. ,				
* 1 * 1						
X 1 0 7	DECT/DODING/KOIADOGI OD 40541 (					
	PEST/PCB UG/KG AROCLOR-1254  (so_sb)					
* 1 * *						

	Y	h	
* 3 * *		General	Statistics
X 3 0 4	Total Number of Observations		Number of Distinct Observations 0
* 1 * 1	Tolerance Factor	N/A	Number of Missing Values 100
X 3 + X			· · · · · · · · · · · · · · · · · · ·
X 1 * *			
X 3 T 0	Warning: This	data set	only has 0 observations!
* 1 * 1	Data set is too small to comput	te reliable	and meaningful statistics and estimates!
X 1 1 1	The data set for variable PEST/PCE	3 UG/KG	AROCLOR-1254  (so_sb) was not processed!
* 1 1 1			
* 1 * *	It is suggested to collect at least 8 to	10 obser	rvations before using these statistical methods!
* 1 * *	If possible, compute and collect Data Quali	ity Object	ives (DQO) based sample size and analytical results.
* 3 1 4			
* 1 * *	DECT/DODING///OIADOOLOD 40541 ()		
X 1 1 0	PEST/PCB UG/KG AROCLOR-1254  (so_ss)		
x 1 1 1		Conorol	Statistics
* 1 1 1	Number of Valid Data		Number of Detected Data 1
R 1 1 1	Number of Distinct Detected Data		Number of Non-Detect Data 39
X 3 7 7	Number of distinct detected data	1	Number of Non-Detect Data 39
N 2 9 N	Warning: Only one distinct data value was detected	ProUCI	(or any other software) should not be used on such a data set!
K 3 9 4			e Project Team to estimate environmental parameters (e.g., EF
H 1 9 1	poolog to goo growing the opposite values gotoriii	iou by the	o i roject roam to commute crivirorimoritar parameters (c.g., Er
X 1 1 X	The data set for variable PEST/PCE	BIUG/KGI	AROCLOR-1254  (so_ss) was not processed!
X 1 2 0		- 1	, and a (ess) mad mad processes.
X 1 1 0			
* 1 1 1			
X 1 1 1	PEST/PCB UG/KG AROCLOR-1260  (br_na)		
* 1 1 1			
* 1 * *		General	Statistics
* 3 1 4	Total Number of Observations	0	Number of Distinct Observations 0
* 1 1 *	Tolerance Factor	N/A	Number of Missing Values 30
* 1 * 1			
* 1 1 *			
			only has 0 observations!
* 1 * 1			e and meaningful statistics and estimates!
* 1 * 1	The data set for variable PEST/PCE	SjUG/KGj	AROCLOR-1260  (br_na) was not processed!
* 1 * 1	It is suggested to collect at least 9 to	10 obsor	rvations before using these statistical methods!
* 3 * *			ives (DQO) based sample size and analytical results.
X 1 7 Y	ii possibio, compate and concet bata quan	ity Object	ives (Dae) based sample size and analytical results.
* 1 * *			
X 1 4 1			
x 1 4 x	PEST/PCB UG/KG AROCLOR-1260  (so_sb)		
* 1 * *			
X 3 X 0		General	Statistics
X 2 K T	Total Number of Observations	0	Number of Distinct Observations 0
F 3 F 3	Tolerance Factor	N/A	Number of Missing Values 100
x 1 x x			
* 3 * *			
			only has 0 observations!
* 1 * 1			and meaningful statistics and estimates!
* 1 * *	The data set for variable PEST/PCE	sjug/KGJ	AROCLOR-1260  (so_sb) was not processed!
* 1 * *	It is a compared to a filter of the control of the	40 -1	maken hafan wala shara asylvita kanala dal
X 1 K 0			rvations before using these statistical methods!
x 1 4 1	ii possible, compute and collect Data Quali	iy Object	ives (DQO) based sample size and analytical results.
x 7 4 2			
x 7 4 1			
x 3 4 4	PEST/PCB UG/KG AROCLOR-1260  (so_ss)		
X 1 4 Y	1. 20111 ODJOG/RGJA1100E011-1200J (30_33)		
X 3 4 4		General	Statistics
x 1 4 1	Number of Valid Data		Number of Detected Data 6
x 7 4 x	Number of Distinct Detected Data		Number of Non-Detect Data 34
	of Diomitic Doloctod Data	-	. tazar or from Botoot Bata 04

		,	9 #		
	Tolerance Factor			Percent Non-Detects	85.00%
	Number of Missing Values	75			
			_		
	Raw Statistics	T	Log	g-transformed Statistics	
	Minimum Detected	_		Minimum Detected	
	Maximum Detected			Maximum Detected	_
	Mean of Detected			Mean of Detected	
. •	SD of Detected			SD of Detected	
1 1	Minimum Non-Detect			Minimum Non-Detect	
	Maximum Non-Detect	62		Maximum Non-Detect	4.127
	Data with Multiple Detection Limits			e Detection Limit Scenario	
	Note: Data have multiple DLs - Use of KM Method is			d as Non-Detect with Single DL	
1	For all methods (except KM, DL/2, and ROS Methods	s),		ited as Detected with Single DL	
7	Observations < Largest ND are treated as NDs		Sir	igle DL Non-Detect Percentage	97.509
,					
ų.			Detected Values in th		
3	Note: It should be noted that eve				
	the resulting calculations i	may not be	reliable enough to dr	aw conclusions	
	It is recommended to have 10-15 or mo	re distinct	observations for accu	urate and meaningful results.	
. 1			d Statistics		
, ,	Normal Distribution Test with Detected Values		Lognormal Distrib	oution Test with Detected Value	
	Shapiro Wilk Test Statistic			Shapiro Wilk Test Statistic	
	5% Shapiro Wilk Critical Value	0.788		5% Shapiro Wilk Critical Value	0.788
	Data appear Normal at 5% Significance Lev	/el	Data appear L	ognormal at 5% Significance L	.evel
1					
,	Assuming Normal Distribution		Assum	ing Lognormal Distribution	
	DL/2 Substitution Method			DL/2 Substitution Method	I
	Mean	29.74		Mean (Log Scale)	3.333
		13.11		SD (Log Scale)	
,	95% UTL 90% Coverage	51.89		95% UTL 90% Coverage	
	95% UPL (t)			95% UPL (t)	
. ,	90% Percentile (z)			90% Percentile (z)	
	95% Percentile (z)			95% Percentile (z)	
	99% Percentile (z)			99% Percentile (z)	
1	(-)			(2)	
	Maximum Likelihood Estimate(MLE) Method	NI/A			
		IIV/A		Log ROS Method	ı
•		IN/A		Log ROS Method  Mean in Original Scale	
		IN/A		Mean in Original Scale	31.19
		IN/A		Mean in Original Scale SD in Original Scale	31.19
•		N/A		Mean in Original Scale SD in Original Scale Mean in Log Scale	31.19 13.67 3.369
		IV/A		Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale	31.19 13.67 3.369 0.362
1 1		IV/A		Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale 95% UTL 90% Coverage	31.19 13.67 3.369 0.362 53.59
1 1 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		IV/A		Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t)	31.19 13.67 3.369 0.362 53.59 53.9
* * * * * * * * * * * * * * * * * * *		IVA		Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	31.19 13.67 3.369 0.362 53.59 53.9 46.22
* * * * * * * * * * * * * * * * * * *		IVA		Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	31.19 13.67 3.369 0.362 53.59 53.9 46.22 52.73
* 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		IVA		Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	31.19 13.67 3.369 0.362 53.59 53.9 46.22 52.73
2 2 2 4 4	Gamma Distribution Test with Detected Values		Data Distributi	Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	31.19 13.67 3.369 0.362 53.59 53.9 46.22 52.73 67.5
2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Gamma Distribution Test with Detected Values k star (bias corrected)	s Only		Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	31.19 13.67 3.369 0.362 53.59 53.9 46.22 52.73 67.5
* * * * * * * * * * * * * * * * * * *	k star (bias corrected)	6.722		Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	31.19 13.67 3.369 0.362 53.59 53.9 46.22 52.73 67.5
* * * * * * * * * * * * * * * * * * *	k star (bias corrected) Theta Star	6.722 8.406		Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	31.19 13.67 3.369 0.362 53.59 53.9 46.22 52.73 67.5
* * * * * * * * * * * * * * * * * * *	k star (bias corrected)	6.722 8.406		Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	31.19 13.67 3.369 0.362 53.59 53.9 46.22 52.73 67.5
	k star (bias corrected) Theta Star nu star	6.722 8.406 80.66	Data appear	Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z)	31.19 13.67 3.369 0.362 53.59 53.9 46.22 52.73 67.5
	k star (bias corrected) Theta Star nu star A-D Test Statistic	6.722 8.406 80.66	Data appear	Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)	31.19 13.67 3.369 0.362 53.59 46.22 52.73 67.5
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value	6.722 8.406 80.66 0.253 0.698	Data appear	Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) von Test with Detected Values Normal at 5% Significance Lev	31.19 13.67 3.369 0.362 53.59 46.22 52.73 67.5
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	6.722 8.406 80.66 0.253 0.698 0.188	Data appear	Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) von Test with Detected Values Normal at 5% Significance Lev Conparametric Statistics Kaplan-Meier (KM) Method	31.19 13.67 3.369 0.362 53.59 46.22 52.73 67.5 Only
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	6.722 8.406 80.66 0.253 0.698 0.188 0.332	Data appear	Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z)  On Test with Detected Values Normal at 5% Significance Lev  Description of Statistics Kaplan-Meier (KM) Method Mean SD	31.19 13.67 3.369 0.362 53.59 53.9 46.22 52.73 67.5 Only rel
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic	6.722 8.406 80.66 0.253 0.698 0.188 0.332	Data appear	Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 95% Percentile (z) 95% Second Significance Level Con Test with Detected Values Normal at 5% Significance Level Conparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean	31.19 13.67 3.369 0.362 553.59 46.22 52.73 67.5 Only rel
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Data appear Gamma Distributed at 5% Significan	6.722 8.406 80.66 0.253 0.698 0.188 0.332	Data appear	Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Residential (z) 00 Test with Detected Values Normal at 5% Significance Level 00 Mean SD SE of Mean 00 KM UTL with 90% Coverage	31.19 13.67 3.369 0.362 553.59 46.22 52.73 67.5 Only rel
	k star (bias corrected) Theta Star nu star  A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value	6.722 8.406 80.66 0.253 0.698 0.188 0.332	Data appear	Mean in Original Scale SD in Original Scale Mean in Log Scale SD in Log Scale SD in Log Scale 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 95% Percentile (z) 95% Second Significance Level Con Test with Detected Values Normal at 5% Significance Level Conparametric Statistics Kaplan-Meier (KM) Method Mean SD SE of Mean	31.19 13.67 3.369 0.362 553.59 53.9 46.22 52.73 67.5 Only rel 37.93 10.33 1.904 55.38 83.5

	, t t t t			
	Median	6 107	95% Percentile	(2) 54 02
				` '
		22.28	99% Percentile	(Z) 61.95
		0.128		
	Theta star	136.3	Gamma ROS Limits with Extrapolated	Data
* 1 1	Nu star	10.23	95% Wilson Hilferty (WH) Approx. Gamma L	JPL 83.05
	95% Percentile of Chisquare (2k)	1.447	95% Hawkins Wixley (HW) Approx. Gamma L	JPL 110.6
* 1 *		1	95% WH Approx. Gamma UTL with 90% Covers	
	90% Percentile	E0 10	95% HW Approx. Gamma UTL with 90% Covers	
			95% HW Approx. Gaillina OTL With 90% Cover	age 106.2
	95% Percentile			
	99% Percentile	244		
	Note: DL/2 is not a recommended method.			
x + +				
	DEST/DODILIC/VOIDETA DUCI (br. po)			
	PEST/PCB UG/KG BETA-BHC  (br_na)			
			Statistics	
	Total Number of Observations	0	Number of Distinct Observati	ons 0
	Tolerance Factor	N/A	Number of Missing Val	ues 30
F 1 3				
* * *				
	14/ <sub>2 m.12</sub> <b>T</b> L 1	o deta	anhy haa 0 ahaanyatianal	
			only has 0 observations!	
			e and meaningful statistics and estimates!	
	The data set for variable PEST	/PCB UG/k	KG BETA-BHC  (br_na) was not processed!	
F F 3				
	It is suggested to collect at least 8 t	o 10 obse	rvations before using these statistical methods!	
			tives (DQO) based sample size and analytical res	ulte
	ii possibie, compute and collect Data Que	inty Object	aves (Date) based sample size and analytical res	uito.
	PEST/PCB UG/KG BETA-BHC  (so_sb)			
		General	Statistics	
* * *	Total Number of Observations		Number of Distinct Observati	one O
* * 1	Tolerance Factor	-		
	Tolerance Factor	IN/A	Number of Missing Val	Jes 100
* : *	Warning: Thi	s data set	only has 0 observations!	
F 3 F	Data set is too small to comp	ute reliable	e and meaningful statistics and estimates!	
k 7 1	The data set for variable PEST/	PCBJUG/k	(G BETA-BHC  (so_sb) was not processed!	
Y 1 Y			1 1 1 1	
r 1 1	It is sunnested to collect at least 9 to	n 10 nhea	rvations before using these statistical methods!	
			tives (DQO) based sample size and analytical res	ulto
	ir possible, compute and collect Data Qua	ility Object	uves (DQO) based sample size and analytical res	uits.
. 1 1				
* 1 *				
* 1 *	PEST/PCB UG/KG BETA-BHC  (so_ss)			
	1 1 1 ()			
		General	Statistics	
	Alternation of Maria December 1		T	-t- 0
	Number of Valid Data	-	Number of Detected D	
	Number of Distinct Detected Data	0	Number of Non-Detect D	ata 40
	Warning: All observations are Non-Detects	(NDs), the	erefore all statistics and estimates should also be	NDs!
			istics are also NDs lying below the largest detect	
	The Project Team may decide to use alternative sit			
	ins . Tojou Toam may acolae to use alternative sit	- opcome	.a.a.s to commute environmental parameters (e.g	,., 0, 01
	The date and 111 5-6-	DOD!!!	COIDETA DUOL (ac) "	
	i ne data set for variable PEST/	PUBIUG/K	(G BETA-BHC  (so_ss) was not processed!	
	PEST/PCB UG/KG DELTA-BHC  (br_na)			
		<b>.</b>	On-al-al-	
		General	Statistics	
		1		
	Total Number of Observations	1	Number of Distinct Observati	ons 0

		-
* * * 1	Tolerance Factor N/A Number of Missing Values 30	
	Warning: This data set only has 0 observations!	
	Data set is too small to compute reliable and meaningful statistics and estimates!	
* * * :	The data set for variable PEST/PCB UG/KG DELTA-BHC  (br_na) was not processed!	
	It is a compared to collect at least 0 to 40 sharmostions before union the constant stool mathe del	
	It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.	
	in possible, compute and concer bata quality objectives (bac) based cample size and analytical results.	
		•
	DEGT/DODULO//CODELTA BLIGL(	
	PEST/PCB UG/KG DELTA-BHC  (so_sb)	
	General Statistics	
* + 1 1	Total Number of Observations 0 Number of Distinct Observations 0	
	Tolerance Factor N/A Number of Missing Values 100	<u>)                                    </u>
	Warning: This data set only has 0 observations!	
* 1 1	Data set is too small to compute reliable and meaningful statistics and estimates!	
	The data set for variable PEST/PCB UG/KG DELTA-BHC  (so_sb) was not processed!	
	It is a composited to collect at least 0 to 40 sharmations before using these statistical mathedal	
	It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.	
	in possible, compute and concer bata quality objectives (b qo) based cample size and analytical results.	
+ 1 1		
	PEST/PCB UG/KG DELTA-BHC  (so_ss)	
* * 1 1	General Statistics	
* + 1 *	Number of Valid Data 40 Number of Detected Data 0	
* * 1 *	Number of Distinct Detected Data 0 Number of Non-Detect Data 40	
	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!	
* + 1 1	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit	t!
* * 1 1	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC,	
	TI I I DEST/DODING//OIDELTA BUOL/	
	The data set for variable PEST/PCB UG/KG DELTA-BHC  (so_ss) was not processed!	
K + 1 1		
* * : *		-
	PEST/PCB UG/KG DIELDRIN  (br_na)	
	General Statistics	
* * * 1	Total Number of Observations 0 Number of Distinct Observations 0	
	Tolerance Factor N/A Number of Missing Values 30	
	Warning: This data set only has 0 observations!	
* * * 1	Data set is too small to compute reliable and meaningful statistics and estimates!	
	The data set for variable PEST/PCB UG/KG DIELDRIN  (br_na) was not processed!	
	It is suggested to collect at least 8 to 10 observations before using these statistical methods!	
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.	
	1	
	PEST/PCB UG/KG DIELDRIN  (so_sb)	-
	General Statistics  Total Number of Observations 0 Number of Distinct Observations 0	
	Tolerance Factor N/A Number of Distinct Observations 0  Tolerance Factor N/A Number of Missing Values 100	0
	Tailor of Wildeling Values Too	
	1	

	A R C D		0 1 1 2	
1	Warning: Thi	e data cat	only has 0 observations!	
1				
			and meaningful statistics and estimates!	
	The data set for variable PEST/	PCB UG/K	G DIELDRIN  (so_sb) was not processed!	
			vations before using these statistical methods!	
	If possible, compute and collect Data Qua	lity Object	ves (DQO) based sample size and analytical results	
* 3 *				
* 1 1	PEST/PCB UG/KG DIELDRIN  (so_ss)			
* 1 1	, , , , , , , , , , , , , , , , , , , ,			
6 3 T		General	Statistics	
* 1 *	Number of Valid Data	40	Number of Detected Data	2
* 1 1	Number of Distinct Detected Data	-	Number of Non-Detect Data	
0 1 7			only 2 Detected Values.	00
* 1 1			I and reliable test statistics and estimates.	
e 2 K			ill be produced!	
	NO S	statistics w	iii be produced:	
		4.00	B B	05.000/
	Tolerance Factor		Percent Non-Detects	95.00%
	Number of Missing Values	/5		
,				
	Raw Statistics		Log-transformed Statistics	
	Minimum Detected	13	Minimum Detected	2.565
	Maximum Detected	26	Maximum Detected	3.258
	Mean of Detected	19.5	Mean of Detected	2.912
* * 1	SD of Detected	9.192	SD of Detected	0.49
	Minimum Non-Detect	3.4	Minimum Non-Detect	1.224
	Maximum Non-Detect	6.2	Maximum Non-Detect	1.825
		0.2		
	Data with Multiple Detection Limits		Single Detection Limit Scenario	
:	Note: Data have multiple DLs - Use of KM Method is			
		rocommon	Number treated as Non Detect with Single DI	20
1				
	For all methods (except KM, DL/2, and ROS Methods		Number treated as Detected with Single DL	2
				2
	For all methods (except KM, DL/2, and ROS Methods		Number treated as Detected with Single DL	2
	For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs	5),	Number treated as Detected with Single DL Single DL Non-Detect Percentage	2
* * T	For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data se	s), et has only	Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values.	2
	For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data see This may not be adequate enough to ce	et has only	Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values. eaningful and reliable test statistics and estimates.	2 95.00%
* * T	For all methods (except KM, DL/2, and ROS Methods Observations < Largest ND are treated as NDs  Warning: Data see This may not be adequate enough to ce	et has only	Number treated as Detected with Single DL Single DL Non-Detect Percentage  2 Distinct Detected Values.	2 95.00%
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2 4				
3 4				
	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
9 1			Mean in Original Scale	N/A
1 1			SD in Original Scale	N/A
			Mean in Log Scale	N/A
			SD in Log Scale	N/A
			95% UTL 90% Coverage	N/A
1 1			95% UPL (t)	N/A
1 1			90% Percentile (z)	N/A
			95% Percentile (z)	N/A
1 1			99% Percentile (z)	N/A
3 4			33701 Greenule (2)	14// (
1 1	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values C	nlv
	k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0	
1 *	Theta Star	N/A	Data de Net fellew à Discernable Distribution (e	.00)
	nu star	N/A		
	nu star	11//		
1 1	A-D Test Statistic	N/A	Nonparametric Statistics	
	5% A-D Critical Value	N/A	•	
	5% A-D Critical Value  K-S Test Statistic	N/A N/A	Kaplan-Meier (KM) Method Mean	13 22
	5% K-S Critical Value	N/A N/A		2.03
	Data not Gamma Distributed at 5% Significance		SE of Mean	
* 1	Data not Gamma Distributed at 5% Significance	Level		
	Assuming Commercialists		95% KM UTL with 90% Coverage	
	Assuming Gamma Distribution		95% KM Chebyshev UPL	
	Gamma ROS Statistics with Extrapolated Data	NI/A	95% KM UPL (t)	
	Mean	N/A	90% Percentile (z)	
1 2	Median	N/A	95% Percentile (z)	
	SD	N/A	99% Percentile (z)	18.05
	k star	N/A		
	Theta star	N/A	Gamma ROS Limits with Extrapolated Data	
	Nu star	N/A	95% Wilson Hilferty (WH) Approx. Gamma UPL	N/A
	95% Percentile of Chisquare (2k)	N/A	95% Hawkins Wixley (HW) Approx. Gamma UPL	N/A
			95% WH Approx. Gamma UTL with 90% Coverage	N/A
	90% Percentile	N/A	95% HW Approx. Gamma UTL with 90% Coverage	N/A
'	95% Percentile	N/A		
		N/A		
	99% Percentile			
* 1	Note: DL/2 is not a recommended method.			
e 0	Note: DL/2 is not a recommended method.			
e 1 e 2 e 2 e 3 e 4				
e 1 e 1 e 2 e 2	Note: DL/2 is not a recommended method.	General	Statistics	
e 0 e 1 e 2 e 2 e 4 e 4 e 5	Note: DL/2 is not a recommended method.		Statistics  Number of Distinct Observations	0
e 3 e 3 e 4 e 5 e 5 e 5 e 6 e 7	Note: DL/2 is not a recommended method.  PEST/PCB UG/KG ENDOSULFAN I  (br_na)		Number of Distinct Observations	
	Note: DL/2 is not a recommended method.  PEST/PCB UG/KG ENDOSULFAN I  (br_na)  Total Number of Observations	0		
* * * * * * * * * * * * * * * * * * *	Note: DL/2 is not a recommended method.  PEST/PCB UG/KG ENDOSULFAN I  (br_na)  Total Number of Observations	0	Number of Distinct Observations	
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	Note: DL/2 is not a recommended method.  PEST/PCB UG/KG ENDOSULFAN I  (br_na)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu	0 N/A s data set	Number of Distinct Observations Number of Missing Values only has 0 observations! a and meaningful statistics and estimates!	
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Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable PEST/PCBIUG/KGIENDOSULFAN II (so sb) was not processed! It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. PEST/PCB|UG/KG|ENDOSULFAN II (so ss) General Statistics Number of Valid Data 40 Number of Detected Data 0 Number of Distinct Detected Data 0 Number of Non-Detect Data 40 Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV) The data set for variable PEST/PCB|UG/KG|ENDOSULFAN II (so ss) was not processed! PEST/PCB|UG/KG|ENDOSULFAN II| (br\_na) General Statistics Total Number of Observations 0 Number of Distinct Observations 0 Tolerance Factor Number of Missing Values 30 N/A Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable PEST/PCB|UG/KG|ENDOSULFAN II| (br\_na) was not processed! It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. PEST/PCB|UG/KG|ENDOSULFAN II| (so\_sb) General Statistics Total Number of Observations 0 Number of Distinct Observations 0 Tolerance Factor Number of Missing Values 100 Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable PEST/PCB|UG/KG|ENDOSULFAN II| (so\_sb) was not processed! It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. PEST/PCB|UG/KG|ENDOSULFAN II| (so\_ss) **General Statistics** Number of Valid Data 40 Number of Detected Data 0 Number of Distinct Detected Data 0 Number of Non-Detect Data 40 Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV)

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1 1			erefore all statistics and estimates should also be NDs! istics are also NDs lying below the largest detection limit!
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* 1 1 1	Warning: All observations are Non-Detects (N	NDs) the	refore all e	tatistics ar	nd estimat	es should a	Iso he ND	s!
* 1 1 1	Specifically, sample mean, UCLs, UPLs, and ot							
* 1 1 1	The Project Team may decide to use alternative site s							
* 1 1 *	, , , , , , , , , , , , , , , , , , , ,	•						,
* 1 1 1	The data set for variable PEST/F	PCBIUG/	KGJENDRI	N  (so_ss)	was not r	processed!		
* 1 1 1		•	•	/	•			
* 1 1 *								
. 1 1 0								
	PEST/PCB UG/KG GAMMA-BHC (LINDANE)  (br_na	1)						
	, ,,,,,,	-						
		General	Statistics					
	Total Number of Observations 0			N	lumber of	Distinct Obs	servations	0
	-							-

	Y Y C D	,	0 H 1 1 K F
	Tolerance Factor	N/A	Number of Missing Values 30
		ļ	
	<u> </u>		only has 0 observations!
	<u> </u>		and meaningful statistics and estimates!
	The data set for variable PEST/PCB UG/F	KG GAM	MA-BHC (LINDANE)  (br_na) was not processed!
* 1 1 1	It is suggested to collect at least 8 to 1	10 obcon	vations before using these statistical methods!
* 1 1 1			ves (DQO) based sample size and analytical results.
	possible, compare and concer bath during	, 02,00	is to (5 4.5) business campio size and analysis and research
	PEST/PCB UG/KG GAMMA-BHC (LINDANE)  (so_sb	)	
	,	General S	Ptentinting
	Total Number of Observations 0	General	Number of Distinct Observations 0
	Tolerance Factor	N/A	Number of Missing Values 100
+ 1 + 1	10.0.0.0.00		Trainise of micesing reliace 1.00
* 1 * 1			
* 1 * 1	-		only has 0 observations!
			and meaningful statistics and estimates!
	The data set for variable PEST/PCB UG/k	KG GAM	MA-BHC (LINDANE)  (so_sb) was not processed!
	It is suggested to collect at least 9 to 1	10 obcon	vations before using these statistical methods!
			ves (DQO) based sample size and analytical results.
* 1 1 *	in possible, compute and conset Data Quanty	Objecti	(DQO) basea sample size and analytical results.
* 1 1 1			
* 1 1 1			
* 1 1 1	PEST/PCB UG/KG GAMMA-BHC (LINDANE)  (so_ss)	5)	
* * * * *			
		General S	
* 1 1 1	Number of Valid Data 40 Number of Distinct Detected Data 0	U	Number of Detected Data 0  Number of Non-Detect Data 40
* 1 1 1	Number of distinct detected data of		Nulliber of Non-Detect Data 40
* 1 1 *	Warning: All observations are Non-Detects (N	IDs), the	refore all statistics and estimates should also be NDs!
			tics are also NDs lying below the largest detection limit!
	The Project Team may decide to use alternative site s	pecific v	alues to estimate environmental parameters (e.g., EPC, BTV)
	The data set for variable PEST/PCB UG/F	KGIGAM	MA-BHC (LINDANE)  (so_ss) was not processed!
	The data set for variable PEST/PCB UG/h	KG GAM	MA-BHC (LINDANE)  (so_ss) was not processed!
	The data set for variable PEST/PCB UG/r	KG GAM	MA-BHC (LINDANE)  (so_ss) was not processed!
* 1 * 1 * 1 * 1 * 1 * *		KG GAM	MA-BHC (LINDANE)  (so_ss) was not processed!
* 1 * 1  * 1 * 1  * 1 * 1	The data set for variable PEST/PCB UG/k	KG GAM	MA-BHC (LINDANE)  (so_ss) was not processed!
* 2 * 1  * 2 * 1  * 2 * 1  * 3 * 4  * 3 * 4  * 3 * 4  * 3 * 4	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)	General S	
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  ( Total Number of Observations   0	General S	Statistics  Number of Distinct Observations 0
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)		Statistics
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  ( Total Number of Observations   0	General S	Statistics  Number of Distinct Observations 0
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0  Tolerance Factor	General S	Statistics  Number of Distinct Observations 0  Number of Missing Values 30
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0  Tolerance Factor  Warning: This definitions   0	General S	Statistics  Number of Distinct Observations 0  Number of Missing Values 30  only has 0 observations!
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute	General N/A	Statistics  Number of Distinct Observations 0  Number of Missing Values 30
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute	General N/A	Number of Distinct Observations 0 Number of Missing Values 30  In the statistics and estimates!
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute The data set for variable PEST/PCB UG	General S  N/A  data set conceilable //KG GAI	Number of Distinct Observations 0 Number of Missing Values 30  Inly has 0 observations! and meaningful statistics and estimates!  MMA-CHLORDANE  (br_na) was not processed!  Vations before using these statistical methods!
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute The data set for variable PEST/PCB UG	General S  N/A  data set conceilable //KG GAI	Number of Distinct Observations 0 Number of Missing Values 30  only has 0 observations! and meaningful statistics and estimates!  MMA-CHLORDANE  (br_na) was not processed!
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute The data set for variable PEST/PCB UG	General S  N/A  data set conceilable //KG GAI	Number of Distinct Observations 0 Number of Missing Values 30  Inly has 0 observations! and meaningful statistics and estimates!  MMA-CHLORDANE (br_na) was not processed!  Vations before using these statistical methods!
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute The data set for variable PEST/PCB UG	General S  N/A  data set conceilable //KG GAI	Number of Distinct Observations 0 Number of Missing Values 30  Inly has 0 observations!  and meaningful statistics and estimates!  MMA-CHLORDANE  (br_na) was not processed!  vations before using these statistical methods!
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute The data set for variable PEST/PCB UG.  It is suggested to collect at least 8 to 1 If possible, compute and collect Data Quality	General S  N/A  data set conceilable //KG GAI	Number of Distinct Observations 0 Number of Missing Values 30  Inly has 0 observations! and meaningful statistics and estimates!  MMA-CHLORDANE  (br_na) was not processed!  Vations before using these statistical methods!
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute The data set for variable PEST/PCB UG	General S  N/A  data set conceilable //KG GAI	Number of Distinct Observations 0 Number of Missing Values 30  Inly has 0 observations!  and meaningful statistics and estimates!  MMA-CHLORDANE  (br_na) was not processed!  vations before using these statistical methods!
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute The data set for variable PEST/PCB UG.  It is suggested to collect at least 8 to 1 If possible, compute and collect Data Quality  PEST/PCB UG/KG GAMMA-CHLORDANE  (so_sb)	General S N/A data set o reliable k/KG GAN 10 obsen y Objectiv	Number of Distinct Observations   0   Number of Missing Values   30   30   30   30   30   30   30   3
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute The data set for variable PEST/PCB UG.  It is suggested to collect at least 8 to 1 If possible, compute and collect Data Quality  PEST/PCB UG/KG GAMMA-CHLORDANE  (so_sb)	General S  N/A  data set conceilable //KG GAI	Number of Distinct Observations   0   Number of Missing Values   30   30   30   30   30   30   30   3
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute The data set for variable PEST/PCB UG.  It is suggested to collect at least 8 to 1 If possible, compute and collect Data Quality  PEST/PCB UG/KG GAMMA-CHLORDANE  (so_sb)	General S N/A data set o reliable k/KG GAN 10 obsen y Objectiv	Number of Distinct Observations   0   Number of Missing Values   30   30   30   30   30   30   30   3
	PEST/PCB UG/KG GAMMA-CHLORDANE  (br_na)  Total Number of Observations   0 Tolerance Factor  Warning: This d Data set is too small to compute The data set for variable PEST/PCB UG.  It is suggested to collect at least 8 to 1 If possible, compute and collect Data Quality  PEST/PCB UG/KG GAMMA-CHLORDANE  (so_sb)	General S  N/A  data set con reliable s/KG GAP  10 observe Objective  General S	Number of Distinct Observations 0 Number of Missing Values 30  Inly has 0 observations! In and meaningful statistics and estimates! In MA-CHLORDANE  (br_na) was not processed! In a statistical methods! In a statistical method methods! In a statistical method methods! In a statistical method met

			q			1		r
	Warning: Thi	s data set	only has 0	observatio	ns!			
	Data set is too small to compu					estimates	l	
	The data set for variable PEST/PCB L							
1 1 1	1110 data oo too tanasio . 20 111 oo ja				(00_02)			
	It is suggested to collect at least 8 t	o 10 obsei	rvations bef	ore usina	these sta	tistical me	thods!	
	If possible, compute and collect Data Qua							<b>.</b>
	ii poodibio, compate and concer bata qua	, 02,000				ana anan		•
	<del> </del>							
	<u> </u>							
1 1 4	PEST/PCB UG/KG GAMMA-CHLORDANE  (so_ss	1						
1 1 0	TESTA OBJUGANCAJOS UNION OTIESTOS UNEJ (00_00)	<u>,                                     </u>						
	<del> </del>	General	Statistics					
1 1 1	Number of Valid Data				Nu	mber of De	tected Data	3
1 1 1	Number of Distinct Detected Data						Detect Data	
	Warning: Da		only 3 Dete	cted Value		701 01 11011 1	JCICCI DUIG	07
	This is not enough to compute					d estimate		
			ill be produ		usuos am	u osumato.	J.	
	1100	otationico W	iii be produ	Coui				
	Tolerance Factor	1 60				Dercent N	lon-Detects	02 50%
1 1 0	Number of Missing Values					1 CICCIII I	ion-Detects	32.30 /0
	Number of Missing Values	73						
1 1 1	Raw Statistics			Lo	a transfo	rmed Statis	etice	
1 1 1	Minimum Detected	2 0		LO	y-u ansio		m Detected	1 02
	Maximum Detected  Maximum Detected						m Detected	
	Mean of Detected						of Detected	_
	SD of Detected						of Detected	-
1 3 4	Minimum Non-Detect						Non-Detect	-
4 1 1	Maximum Non-Detect							
	Maximum Non-Detect	3.2				Maximum	Non-Detect	1.103
	Data with Multiple Data stion Limite			Olm al	- D-4	am Limela Oa		
	Data with Multiple Detection Limits		N.			on Limit So		00
	Note: Data have multiple DLs - Use of KM Method is		Nur	nber treate	d as Non	-Detect wit	h Single DL	38
1 1 1	For all methods (except KM, DL/2, and ROS Methods	S),	N				h Single DL	
	Observations < Largest ND are treated as NDs			Sir	igle DL N	ion-Detect	Percentage	95.00%
	_							
	Marshau Thousan an	h. O Disale	at Data ata d	Maluaa !n	46.2 4.44			
	Warning: There are or The number of detected data may not be ade						I DOC moth	ada
7 7 1							I ROS IIIeui	ous.
	Those methods will i	eturna iv	/A value of	your outp	ut dispia	y!		
	It is necessary to have 4	or more Di	iotinot Volu	o for boot	otron mo	thada		
	It is necessary to have 4 However, results obtained							
	It is recommended to have 10 to 15 or more						and actimate	20
	it is recommended to have to to 15 of more	ODS-CIVALI	ons for acc	urate and	illealilligi	iui results d	illa esulliau	55.
1 1 2	•	Backgrour	nd Statistics	,				
			nd Statistics		oution To	st with Det	ected Value	s Only
	Normal Distribution Test with Detected Values	Only					ected Value	
T 1 2	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic	Only 0.958			Sha	piro Wilk T	est Statistic	0.993
T E T	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.958 0.767	Lognor	mal Distrib	Sha 5% Sha	piro Wilk T piro Wilk C	est Statistic ritical Value	0.993 0.767
T E Z T E Z	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic	0.958 0.767	Lognor	mal Distrib	Sha 5% Sha	piro Wilk T piro Wilk C	est Statistic	0.993 0.767
T	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Level	0.958 0.767	Lognor	mal Distrit a appear L	Sha 5% Sha .ognorma	piro Wilk T piro Wilk C I <b>l at 5% Si</b> g	est Statistic ritical Value <b>gnificance L</b> o	0.993 0.767
T 0 7	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev Assuming Normal Distribution	0.958 0.767 <b>vel</b>	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma	piro Wilk T piro Wilk C Il at 5% Sig normal Dist	est Statistic ritical Value gnificance Le tribution	0.993 0.767
T	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method	0.958 0.767 vel	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma	piro Wilk T piro Wilk C Il at 5% Sig normal Dist /2 Substitu	est Statistic ritical Value gnificance Le tribution tion Method	0.993 0.767 <b>evel</b>
	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method Mean	0.958 0.767 vel	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma	piro Wilk T piro Wilk C Il at 5% Sig normal Dist /2 Substitut Mean	est Statistic ritical Value gnificance Lo tribution tion Method (Log Scale)	0.993 0.767 <b>evel</b> 0.337
	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method Mean SD	0.958 0.767 vel 1.541 1.057	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma ning Logr DL	piro Wilk T piro Wilk C Il at 5% Sig normal Dist /2 Substitut Mean SD	est Statistic ritical Value gnificance Le tribution tion Method (Log Scale) (Log Scale)	0.993 0.767 <b>evel</b> 0.337 0.356
	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage	0.958 0.767 wel 1.541 1.057 3.327	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma ning Logr DL	piro Wilk T piro Wilk C al at 5% Signormal Dist /2 Substitut Mean SD 6 UTL 90%	est Statistic ritical Value gnificance Lo tribution tion Method (Log Scale) (Log Scale) 6 Coverage	0.993 0.767 evel 0.337 0.356 2.558
	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t)	0.958 0.767 vel 1.541 1.057 3.327 3.344	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma ning Logr DL	piro Wilk T piro Wilk C al at 5% Signormal Dist /2 Substitut Mean SD 6 UTL 90%	est Statistic ritical Value gnificance Lo tribution tion Method (Log Scale) (Log Scale) 6 Coverage 95% UPL (t)	0.993 0.767 evel 0.337 0.356 2.558 2.572
	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	0.958 0.767 vel 1.541 1.057 3.327 3.344 2.895	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma ning Logr DL	piro Wilk T piro Wilk C piro Wilk C al at 5% Signormal Dist /2 Substitut Mean SD 6 UTL 90%	est Statistic ritical Value gnificance Lo tribution tion Method (Log Scale) (Log Scale) 6 Coverage 95% UPL (t) ercentile (z)	0.993 0.767 evel 0.337 0.356 2.558 2.572 2.212
	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	0.958 0.767 vel 1.541 1.057 3.327 3.344 2.895 3.279	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma ning Logr DL	piro Wilk T piro Wilk C piro Wilk C al at 5% Signormal Dist /2 Substitut Mean SD 6 UTL 909 90% Po 95% Po	est Statistic ritical Value gnificance Lo tribution tition Method (Log Scale) (Log Scale) 6 Coverage 95% UPL (t) ercentile (z) ercentile (z)	0.993 0.767 evel 0.337 0.356 2.558 2.572 2.212 2.517
	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	0.958 0.767 vel 1.541 1.057 3.327 3.344 2.895 3.279	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma ning Logr DL	piro Wilk T piro Wilk C piro Wilk C al at 5% Signormal Dist /2 Substitut Mean SD 6 UTL 909 90% Po 95% Po	est Statistic ritical Value gnificance Lo tribution tion Method (Log Scale) (Log Scale) 6 Coverage 95% UPL (t) ercentile (z)	0.993 0.767 evel 0.337 0.356 2.558 2.572 2.212 2.517
	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	1.541 1.057 3.327 3.344 2.895 3.999	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma ning Logr DL	piro Wilk T piro Wilk C piro Wilk C ll at 5% Sig normal Dist /2 Substitut Mean SD 6 UTL 90% 90% Po 95% Po 99% Po	est Statistic ritical Value ritical Value ritical Value riticance Lo ribution tion Method (Log Scale) (Log Scale) 6 Coverage 95% UPL (t) ercentile (z) ercentile (z)	0.993 0.767 evel 0.337 0.356 2.558 2.572 2.212 2.517
	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	1.541 1.057 3.327 3.344 2.895 3.999	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma hing Logr DL 95%	piro Wilk T piro Wilk C piro Wilk C ll at 5% Sig normal Dist /2 Substitut Mean SD 6 UTL 90% 90% Po 95% Po 99% Po	est Statistic ritical Value ri	0.993 0.767 evel 0.337 0.356 2.558 2.572 2.212 2.517 3.209
	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	1.541 1.057 3.327 3.344 2.895 3.999	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma hing Logr DL 95%	piro Wilk T piro Wilk C piro Wilk C ll at 5% Sig normal Dist /2 Substitur Mean SD 6 UTL 90% 90% Po 95% Po 99% Po Log R Mean in Or	est Statistic ritical Value ritical Value ritical Value riticance L ribution tion Method (Log Scale) (Log Scale) 6 Coverage 95% UPL (t) ercentile (z) ercentile (z) ercentile (z) OS Method iginal Scale	0.993 0.767 evel 0.337 0.356 2.558 2.572 2.212 2.517 3.209
	Normal Distribution Test with Detected Values Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Normal at 5% Significance Lev  Assuming Normal Distribution DL/2 Substitution Method Mean SD 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	1.541 1.057 3.327 3.344 2.895 3.999	Lognor	mal Distrit a appear L	Sha 5% Sha ognorma hing Logr DL 95%	piro Wilk T piro Wilk C piro Wilk C ll at 5% Sig normal Dist /2 Substitu Mean SD 6 UTL 90% 90% Po 95% Po 99% Po Log R Mean in Or SD in Or	est Statistic ritical Value ri	0.993 0.767 evel 0.337 0.356 2.558 2.572 2.212 2.517 3.209 0.648 1.316

	Y F C D E	h	0 N 1 1 E	r
			SD in Log Scale	1 261
1 1 1			95% UTL 90% Coverage	
4 2 4				
4 3 4			95% UPL (t)	
1 1 1			90% Percentile (z)	
			95% Percentile (z)	
			99% Percentile (z)	4.845
	Gamma Distribution Test with Detected Values		Data Distribution Test with Detected Values C	
	k star (bias corrected)	N/A	Data appear Normal at 5% Significance Leve	el
	Theta Star	N/A		
	nu star	N/A		
	A.D.T. (0) (1)	N1/A		
	A-D Test Statistic	N/A	Nonparametric Statistics	
	5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
	K-S Test Statistic	N/A	Mean	
	5% K-S Critical Value	N/A		0.716
	Data not Gamma Distributed at 5% Significance	Level	SE of Mean	
			95% KM UTL with 90% Coverage	
• •	Assuming Gamma Distribution		95% KM Chebyshev UPL	
. 1	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
* 1	Mean	N/A	90% Percentile (z)	
	Median	N/A	95% Percentile (z)	
	SD	N/A	99% Percentile (z)	4.61
	k star	N/A		
* 1	Theta star	N/A	Gamma ROS Limits with Extrapolated Data	a
	Nu star	N/A	95% Wilson Hilferty (WH) Approx. Gamma UPL	N/A
	95% Percentile of Chisquare (2k)	N/A	95% Hawkins Wixley (HW) Approx. Gamma UPL	N/A
			95% WH Approx. Gamma UTL with 90% Coverage	N/A
	90% Percentile	N/A	95% HW Approx. Gamma UTL with 90% Coverage	N/A
	95% Percentile	N/A		
4 4 7	99% Percentile	N/A		
P	PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (br_1			
			Statistics	
	Total Number of Observations	-	Number of Distinct Observations	0
1 1	Tolerance Factor	N/A	Number of Missing Values	30
			only has 0 observations!	
	Data set is too small to compu		and meaningful statistics and estimates!	
1 2		3/KG HEP	TACHLOR EPOXIDE  (br_na) was not processed!	
1 1	The data set for variable PEST/PCB UC	-		
	The data set for variable PEST/PCB UC	o 10 obse	rvations before using these statistical methods!	
1 4	The data set for variable PEST/PCB UC	o 10 obse		i.
	The data set for variable PEST/PCB UC	o 10 obse	rvations before using these statistical methods!	
1	The data set for variable PEST/PCB UC	o 10 obse	rvations before using these statistical methods!	
	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to  If possible, compute and collect Data Qua	o 10 obse lity Object	rvations before using these statistical methods!	
· · · · · · · · · · · · · · · · · · ·	The data set for variable PEST/PCB UC	o 10 obse lity Object	rvations before using these statistical methods!	
· · · · · · · · · · · · · · · · · · ·	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to  If possible, compute and collect Data Qua	o 10 obser lity Object sb)	rvations before using these statistical methods! ives (DQO) based sample size and analytical results	
· · · · · · · · · · · · · · · · · · ·	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so_	o 10 obser lity Object sb)	rvations before using these statistical methods! ives (DQO) based sample size and analytical results Statistics	
· · · · · · · · · · · · · · · · · · ·	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so	o 10 observed the state of the	rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations	0
· · · · · · · · · · · · · · · · · · ·	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so_	o 10 obser lity Object sb)	rvations before using these statistical methods! ives (DQO) based sample size and analytical results Statistics	0
· · · · · · · · · · · · · · · · · · ·	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so	o 10 observed the state of the	rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations	0
· · · · · · · · · · · · · · · · · · ·	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so_  Total Number of Observations  Tolerance Factor	sb)  General  N/A	rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values	0
· · · · · · · · · · · · · · · · · · ·	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so_  Total Number of Observations Tolerance Factor  Warning: This	sb)  General  N/A  s data set	rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations!	0
· · · · · · · · · · · · · · · · · · ·	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so	sb)  General  N/A  s data set	rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!	0
· · · · · · · · · · · · · · · · · · ·	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so	sb)  General  N/A  s data set	rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations!	0
· · · · · · · · · · · · · · · · · · ·	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so	o 10 observation of the control of t	rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  TACHLOR EPOXIDE  (so_sb) was not processed!	0
P	The data set for variable PEST/PCB UC  It is suggested to collect at least 8 to If possible, compute and collect Data Qua  PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so_  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB UC  It is suggested to collect at least 8 to	sb)  General  N/A  s data set the reliable S/KG HEP	rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!	0 100

T 1 1									
	PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so_ss)								
	General Statistics								
	Number of Valid Data 40 Number of Detected Data 0								
	Number of Distinct Detected Data 0 Number of Non-Detect Data 40								
	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
* * 3	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BT								
	The data set for variable PEST/PCB UG/KG HEPTACHLOR EPOXIDE  (so_ss) was not processed!								
1 1 1									
	PEST/PCB UG/KG HEPTACHLOR  (br_na)								
	Team objective monte of (s_na)								
	General Statistics								
Y Y 1	Total Number of Observations 0 Number of Distinct Observations 0								
	Tolerance Factor N/A Number of Missing Values 30								
	Warning: This data set only has 0 observations!								
	Data set is too small to compute reliable and meaningful statistics and estimates!								
	The data set for variable PEST/PCB UG/KG HEPTACHLOR  (br_na) was not processed!								
	It is suggested to collect at least 8 to 10 observations before using these statistical methods!								
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.								
	PEST/PCB UG/KG HEPTACHLOR  (so_sb)								
* 1 1									
1 2 2	General Statistics								
* 1 *	Total Number of Observations 0 Number of Distinct Observations 0								
	Tolerance Factor N/A Number of Missing Values 100								
	Warning: This data set only has 0 observations!								
	Data set is too small to compute reliable and meaningful statistics and estimates!								
	The data set for variable PEST/PCB UG/KG HEPTACHLOR  (so_sb) was not processed!								
	It is suggested to collect at least 8 to 10 observations before using these statistical methods!								
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.								
	PEST/PCB UG/KG HEPTACHLOR  (so_ss)								
	General Statistics								
	Number of Valid Data 40 Number of Detected Data 0								
	Number of Distinct Detected Data 0 Number of Non-Detect Data 40								
	Humber of Bloundt Botolou Bata V								
1 1 1	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
1 1 1	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BT								
	The date and for variable DECT/DODUIG//COURTEDTACHUOD! ( ) "								
r + 1	The data set for variable PEST/PCB UG/KG HEPTACHLOR  (so_ss) was not processed!								
	PEST/PCB UG/KG METHOXYCHLOR  (br_na)								

	Y 5 5 1	h	đ			1	ĸ	r	
	General Statistics								
	Total Number of Observations 0 Number of Distinct Observations 0  Tolerance Factor N/A Number of Missing Values 30								
	l olerance Factor	N/A			Num	Der of ivilss	ing values	30	
* * * 1	Warning: This data set only has 0 observations!								
	Data set is too small to compu								
	The data set for variable PEST/PCB	JUG/KGIN	IETHOXY	CHLORI (b	r_na) was	not proces	ssed!		
	It is appropriate and least at least 0 to	10 abaar	votiona ha	fara walaa	thana ata	intinal mati	a a da l		
* * 1 1	It is suggested to collect at least 8 to 10 observations before using these statistical methods!  If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.								
* * * *	ii pocoibio, compute and concer bata qua	nty Object	700 (DQO)	buoou ou	IIIpio dizo	una unaiye	ioui roouik	, <u> </u>	
	PEST/PCB UG/KG METHOXYCHLOR  (so_sb)								
			O						
	Total Number of Observations		Statistics		lumah ar af	Distinct Ob	ti	0	
	Total Number of Observations Tolerance Factor	N/A		<u> </u>		Distinct Ob ber of Miss			
	Tolerance Factor	IN/A			inuiii	DEI OI IVIISS	ilig values	100	
* * 1 1									
* 4 3 3	Warning: This	data set	only has 0	observatio	ns!				
* * 3 *	Data set is too small to compu								
+ + 1	The data set for variable PEST/PCB	JUG/KGIN	IETHOXY	CHLOR  (s	o_sb) was	not proce	ssed!		
		40.1							
	It is suggested to collect at least 8 to							_	
	If possible, compute and collect Data Qua	ity Objecti	ves (DQO	pased sa	mpie size	and analyt	icai resuits	5.	
	PEST/PCB UG/KG METHOXYCHLOR  (so_ss)								
			Statistics						
	Number of Valid Data					nber of Dete			
* * 1 1	Number of Distinct Detected Data	0			Numb	er of Non-D	etect Data	40	
	Warning: All observations are Non-Detects	(NDs) the	refore all s	tatistics a	nd estimat	es should:	also he NC	)el	
	Specifically, sample mean, UCLs, UPLs, and								
	The Project Team may decide to use alternative site								
		-				•	, ,	,	
	The data set for variable PEST/PCB	JUG/KGIN	IETHOXY	CHLOR  (s	o_ss) was	not proce	ssed!		
	PEST/PCB UG/KG TOTAL AROCLOR  (br_na)								
	FEGT/FOD OG/NG TOTAL ANOCLON  (DI_III)								
	General Statistics								
	Total Number of Observations	0				Distinct Ob			
	Tolerance Factor	N/A		-	Num	ber of Miss	ing Values	30	
	141 • • • •			-b'					
	Warning: This  Data set is too small to compu					aetimataa!			
	The data set for variable PEST/PCB						ssedl		
	data 300 101 Validado 1 E01/1 Ob	12011011		- 3=31 (1	<i>,</i> wac		<b></b>		
* * 1 3	It is suggested to collect at least 8 to								
	If possible, compute and collect Data Qual							3	
	DEGT/DODILIO///O/TOTAL ADOC: OD: /								
	PEST/PCB UG/KG TOTAL AROCLOR  (so_sb)								
		General	Statistics						
		General	Canonca						

	· · · · · · · · · · · · · · · · · · ·			,
	Total Number of Observations	0	Number of Distinct Observations 0	
	Tolerance Factor		Number of Missing Values 100	1
* * 1	Tolerance Factor	11//	Trainber of Missing Values 100	
	Worning: Thi	o doto oot	only has 0 observations!	
* 1 *				
* 1 1			and meaningful statistics and estimates!	
4 3 3	The data set for variable PEST/PCE	ojud/KGji	OTAL AROCLOR  (so_sb) was not processed!	
* 1 7				
* 1 *			vations before using these statistical methods!	
	If possible, compute and collect Data Qua	lity Objecti	ves (DQO) based sample size and analytical results.	
	PEST/PCB UG/KG TOTAL AROCLOR  (so_ss)			
			<b>6.</b> 4. 4.	
			Statistics	
	Number of Valid Data		Number of Detected Data 7	
	Number of Distinct Detected Data		Number of Non-Detect Data 33	
	Tolerance Factor		Percent Non-Detects 82.5	50%
	Number of Missing Values	75		
	Raw Statistics		Log-transformed Statistics	
4 4 1	Minimum Detected	25	Minimum Detected 3.2	19
	Maximum Detected	86	Maximum Detected 4.45	54
	Mean of Detected	52	Mean of Detected 3.88	85
	SD of Detected	19.73	SD of Detected 0.40	04
	Minimum Non-Detect	52	Minimum Non-Detect 3.95	51
	Maximum Non-Detect	72	Maximum Non-Detect 4.27	77
* * 1				
	Data with Multiple Detection Limits	ı	Single Detection Limit Scenario	
	Note: Data have multiple DLs - Use of KM Method is	recommen		
	For all methods (except KM, DL/2, and ROS Methods		Number treated as Detected with Single DL 1	-
4 4 7	Observations < Largest ND are treated as NDs	,,	Single DL Non-Detect Percentage 97.5	50%
	, and the second		<u> </u>	
1 * *	Warning: There	are only 7	Detected Values in this data	
1 + 1			pootstrap may be performed on this data set	
1 0 1			reliable enough to draw conclusions	
1 * 1		-		
1 * *	It is recommended to have 10-15 or mo	re distinct	observations for accurate and meaningful results.	
3 8 8				
3 8 8		Backgroun	d Statistics	
1 0 1	Normal Distribution Test with Detected Values	Only	Lognormal Distribution Test with Detected Values O	nly
1 * K	Shapiro Wilk Test Statistic	0.964	Shapiro Wilk Test Statistic 0.96	61
	5% Shapiro Wilk Critical Value			U3
	5% Shapiro Wilk Chiicai Value	0.803	5% Shapiro Wilk Critical Value 0.80	UJ
	Data appear Normal at 5% Significance Lev		5% Shapiro Wilk Critical Value   0.80  Data appear Lognormal at 5% Significance Level	
1 1 1				
	Data appear Normal at 5% Significance Let		Data appear Lognormal at 5% Significance Level	
	Data appear Normal at 5% Significance Level Assuming Normal Distribution  DL/2 Substitution Method		Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution	
	Data appear Normal at 5% Significance Let  Assuming Normal Distribution  DL/2 Substitution Method  Mean	<b>vel</b> 32.98	Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45	54
	Data appear Normal at 5% Significance Let  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD	/el 32.98 11.91	Assuming Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26	54 63
	Data appear Normal at 5% Significance Level Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage	32.98 11.91 53.11	Assuming Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3	54 63 33
	Data appear Normal at 5% Significance Level Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage 95% UPL (t)	32.98 11.91 53.11 53.3	Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3  95% UPL (t) 49.5	54 63 33 54
	Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	32.98 11.91 53.11 53.3 48.24	Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3  95% UPL (t) 49.5  90% Percentile (z) 44.3	54 63 33 54 31
	Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	32.98 11.91 53.11 53.3 48.24 52.57	Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3  95% UPL (t) 49.5  90% Percentile (z) 44.3	54 63 33 54 31 75
	Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	32.98 11.91 53.11 53.3 48.24 52.57	Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3  95% UPL (t) 49.5  90% Percentile (z) 44.3	54 63 33 54 31 75
	Assuming Normal at 5% Significance Level Assuming Normal Distribution  DL/2 Substitution Method Mean  SD  95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	32.98 11.91 53.11 53.3 48.24 52.57 60.69	Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3  95% UPL (t) 49.5  90% Percentile (z) 44.3  99% Percentile (z) 58.3	54 63 33 54 31 75
	Data appear Normal at 5% Significance Level  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	32.98 11.91 53.11 53.3 48.24 52.57 60.69	Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3  95% UPL (t) 49.5  90% Percentile (z) 44.3  95% Percentile (z) 48.3  99% Percentile (z) 58.3	54 63 33 54 31 75 32
	Assuming Normal at 5% Significance Level Assuming Normal Distribution  DL/2 Substitution Method Mean  SD  95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	32.98 11.91 53.11 53.3 48.24 52.57 60.69	Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3  95% UPL (t) 49.5  90% Percentile (z) 44.3  95% Percentile (z) 48.3  99% Percentile (z) 58.3  Log ROS Method  Mean in Original Scale 40.3	54 63 33 54 31 75 32
	Assuming Normal at 5% Significance Level Assuming Normal Distribution  DL/2 Substitution Method Mean  SD  95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	32.98 11.91 53.11 53.3 48.24 52.57 60.69	Data appear Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3  95% UPL (t) 49.5  90% Percentile (z) 44.3  95% Percentile (z) 48.3  99% Percentile (z) 58.3  Log ROS Method  Mean in Original Scale 40.3	54 63 33 54 31 75 32
	Assuming Normal at 5% Significance Level Assuming Normal Distribution  DL/2 Substitution Method Mean  SD  95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	32.98 11.91 53.11 53.3 48.24 52.57 60.69	Assuming Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3  95% UPL (t) 49.5  90% Percentile (z) 44.3  95% Percentile (z) 48.3  Log ROS Method  Mean in Original Scale 40.3  SD in Original Scale 11.3  Mean in Log Scale 3.66	54 63 33 54 31 75 32 17 19 61
	Assuming Normal at 5% Significance Level Assuming Normal Distribution  DL/2 Substitution Method Mean  SD  95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	32.98 11.91 53.11 53.3 48.24 52.57 60.69	Assuming Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3  95% UPL (t) 49.5  90% Percentile (z) 44.3  95% Percentile (z) 48.3  99% Percentile (z) 58.3  Log ROS Method  Mean in Original Scale 40.3  SD in Original Scale 11.3  Mean in Log Scale 3.66  SD in Log Scale 0.24	54 63 33 54 31 75 32 17 19 61 48
	Assuming Normal at 5% Significance Level Assuming Normal Distribution  DL/2 Substitution Method Mean  SD  95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	32.98 11.91 53.11 53.3 48.24 52.57 60.69	Assuming Lognormal at 5% Significance Level  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) 3.45  SD (Log Scale) 0.26  95% UTL 90% Coverage 49.3  95% UPL (t) 49.5  90% Percentile (z) 44.3  95% Percentile (z) 48.3  Log ROS Method  Mean in Original Scale 40.3  SD in Original Scale 11.3  Mean in Log Scale 3.66	54 63 33 54 31 75 32 17 19 61 48 16

	y			
7.			90% Percentile (z)	53.46
1 0			95% Percentile (z)	
			99% Percentile (z)	
1 1			99% Percentile (2)	09.27
1 1	Gamma Distribution Test with Detected Values	Only	Data Distribution Test with Detected Values 0	Only
1 1	k star (bias corrected)		Data appear Normal at 5% Significance Levi	
1 1	Theta Star		Buta appear Normal at 6 % digimicance Ecv	01
1 4	nu star			
1 1	Tid Star	02.00		
1 1	A-D Test Statistic	0.233	Nonparametric Statistics	
1 6	5% A-D Critical Value		Kaplan-Meier (KM) Method	
	K-S Test Statistic		Mean	42 12
	5% K-S Critical Value			13.32
1 1	Data appear Gamma Distributed at 5% Significant		SE of Mean	
	Data appear damma DioaiDatea at 070 eiginioan		95% KM UTL with 90% Coverage	
	Assuming Gamma Distribution		95% KM Chebyshev UPL	
٠.	Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	
		43.56	90% Percentile (z)	
4 3	Median		95% Percentile (z)	
		14.47	99% Percentile (z)	
	k star		(-)	
	Theta star	6.303	Gamma ROS Limits with Extrapolated Dat	а
	Nu star	552.9	95% Wilson Hilferty (WH) Approx. Gamma UPL	
1 2	95% Percentile of Chisquare (2k)	23.45	95% Hawkins Wixley (HW) Approx. Gamma UPL	
1 7	, , ,		95% WH Approx. Gamma UTL with 90% Coverage	
	90% Percentile	65.68		
	95% Percentile	73.9		
	99% Percentile	91.02		
٠,	PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (br na)	)		
e 1	PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (br_na)		Statistics	
e 1	PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (br_na)  Total Number of Observations	General	Statistics  Number of Distinct Observations	0
e 3		General		
< 1 < 2 < 2 < 4 × 4 × 4 × 4 × 4 × 4 × 4 × 4 × 4 × 4	Total Number of Observations	<b>General</b>	Number of Distinct Observations	
	Total Number of Observations Tolerance Factor	General 0 N/A	Number of Distinct Observations Number of Missing Values	
* * *	Total Number of Observations Tolerance Factor  Warning: This	General 0 N/A	Number of Distinct Observations Number of Missing Values only has 0 observations!	
* 1 * 2 * 4 * 4 * 4 * 4 * 4 * 4 * 4 * 4 * 4	Total Number of Observations Tolerance Factor  Warning: This  Data set is too small to compu	General  0  N/A  s data set ute reliable	Number of Distinct Observations Number of Missing Values only has 0 observations! and meaningful statistics and estimates!	
* 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1	Total Number of Observations Tolerance Factor  Warning: This  Data set is too small to compu	General  0  N/A  s data set ute reliable	Number of Distinct Observations Number of Missing Values only has 0 observations!	
* 1	Total Number of Observations Tolerance Factor  Warning: This  Data set is too small to compu  The data set for variable PEST/PCB L	General  0  N/A  s data set ute reliable  JG/KG TO	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  TAL DDD/DDE/DDT  (br_na) was not processed!	
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable PEST/PCB L	General  0  N/A  s data set ute reliable JG/KG TO	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods!	30
* 1	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable PEST/PCB L	General  0  N/A  s data set ute reliable JG/KG TO	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!  TAL DDD/DDE/DDT  (br_na) was not processed!	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable PEST/PCB L	General  0  N/A  s data set ute reliable JG/KG TO	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods!	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable PEST/PCB L	General  0  N/A  s data set ute reliable JG/KG TO	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods!	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable PEST/PCB L	General  0  N/A  s data set ute reliable JG/KG TO  0 10 obser lity Objecti	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods!	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable PEST/PCB L  It is suggested to collect at least 8 to If possible, compute and collect Data Qua	General  0  N/A  s data set ute reliable JG/KG TO  0 10 obser lity Objecti	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods!	30
* 1	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compu The data set for variable PEST/PCB L  It is suggested to collect at least 8 to If possible, compute and collect Data Qua	General  0  N/A  s data set ute reliable JG/KG TO  0 10 obser lity Object	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods!	30
* 1	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB L  It is suggested to collect at least 8 to the suggested to collect Data Quate the pessible, compute and collect Data Quate PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (so_sb)  Total Number of Observations	General  O N/A  s data set ute reliable JG/KG TO  o 10 obser lity Object  )  General	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations	30
* * * * * * * * * * * * * * * * * * *	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB L  It is suggested to collect at least 8 to the least 8 to the least 8 to the least 8 to le	General  O N/A  s data set ute reliable JG/KG TO  o 10 obser lity Object  )  General	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB L  It is suggested to collect at least 8 to the suggested to collect Data Quate the pessible, compute and collect Data Quate PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (so_sb)  Total Number of Observations	General  O N/A  s data set ute reliable JG/KG TO  o 10 obser lity Object  General	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB L  It is suggested to collect at least 8 to suggested to collect Data Quate the possible, compute and collect Data Quate PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (so_sb)  Total Number of Observations Tolerance Factor	General  0  N/A  s data set ute reliable JG/KG TO  0 10 obser lity Object  Ceneral  0  N/A	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB L  It is suggested to collect at least 8 to suggested to collect Data Qua  If possible, compute and collect Data Qua  PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This	General  0  N/A  s data set ute reliable JG/KG TO  0 10 obser lity Object  )  General  0  N/A	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations!	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB L  It is suggested to collect at least 8 to suggested to collect Data Quate the possible, compute and collect Data Quate PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute	General  O N/A  s data set te reliable  JG/KG TO  O 10 obser  lity Object  O N/A  s data set te reliable	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates!	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB L  It is suggested to collect at least 8 to suggested to collect Data Quate the possible, compute and collect Data Quate PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute	General  O N/A  s data set te reliable  JG/KG TO  O 10 obser  lity Object  O N/A  s data set te reliable	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations!	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB L  It is suggested to collect at least 8 to lif possible, compute and collect Data Quare  PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute data set for variable PEST/PCB U	General  O N/A  s data set te reliable JG/KG TO  O 10 obser lity Object  O N/A  s data set te reliable JG/KG TO	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (so_sb) was not processed!	30
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB L  It is suggested to collect at least 8 to suggested to collect Data Quare PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB UCCB UC	General  O N/A  s data set of the reliable of	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (so_sb) was not processed!  vations before using these statistical methods!	0 100
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB L  It is suggested to collect at least 8 to suggested to collect Data Quare PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB UCCB UC	General  O N/A  s data set of the reliable of	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (so_sb) was not processed!	0 100
	Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB L  It is suggested to collect at least 8 to suggested to collect Data Quare PEST/PCB UG/KG TOTAL DDD/DDE/DDT  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB UCCB UC	General  O N/A  s data set of the reliable of	Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (br_na) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical results  Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! TAL DDD/DDE/DDT  (so_sb) was not processed!  vations before using these statistical methods!	0 100

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PI	LLLL EST/PCB UG/KG TOTAL DDD/DDE/DDT  (so_ss)	\		
- F L		<u> </u>		
		General	Statistics	
	Number of Valid Data		Number of Detected Data	7
* 1	Number of Distinct Detected Data		Number of Non-Detect Data	
	Tolerance Factor		Percent Non-Detects	
			Percent Non-Detects	02.30 /
	Number of Missing Values	73		
	Raw Statistics		Log-transformed Statistics	
0 1	Minimum Detected	2.6	Minimum Detected	1 201
* 1			Maximum Detected	
	Maximum Detected			
	Mean of Detected SD of Detected		Mean of Detected	
			SD of Detected	
1	Minimum Non-Detect		Minimum Non-Detect	
	Maximum Non-Detect	6.2	Maximum Non-Detect	1.825
	Data with Markinto Data atlant Limite		Olerate Detection Limit Occurred	
·	Data with Multiple Detection Limits		Single Detection Limit Scenario	0.5
	ote: Data have multiple DLs - Use of KM Method is			
	or all methods (except KM, DL/2, and ROS Methods	s),	Number treated as Detected with Single DL	
Ot	bservations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	87.50%
			Detected Values in this data	
			pootstrap may be performed on this data set	
1	the resulting calculations r	nay not be	reliable enough to draw conclusions	
	It is recommended to have 10-15 or mo	re distinct	observations for accurate and meaningful results.	
	I	Backgroun	d Statistics	
1	Normal Distribution Test with Detected Values	Only	Lognormal Distribution Test with Detected Value	- O-b
		·,	Logilornia Distribution Test with Detected Value	es Only
1 1	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic	
3 1	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.864		0.937
2 1	•	0.864 0.803	Shapiro Wilk Test Statistic	0.937 0.803
3 Y	5% Shapiro Wilk Critical Value	0.864 0.803	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.937 0.803
3 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution	0.864 0.803	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value	0.937 0.803
3 1 1 2 3 4 2 3 4 4 3 4 4 4 4 4 4 4 4 4 4 4 4	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev	0.864 0.803	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal	0.937 0.803 <b>evel</b>
* * * * * * * * * * * * * * * * * * *	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution	0.864 0.803 <b>rel</b>	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution	0.937 0.803 <b>evel</b>
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean	0.864 0.803 <b>rel</b>	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution DL/2 Substitution Method	0.937 0.803 <b>evel</b> 1.256
* -	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD	0.864 0.803 <b>rel</b> 6.586 12.58	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale)	0.937 0.803 <b>evel</b> 1.256 0.846
*	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage	0.864 0.803 <b>rel</b> 6.586 12.58 27.84	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage	0.937 0.803 <b>evel</b> 1.256 0.846 14.67
· · · · · · · · · · · · · · · · · · ·	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)	0.864 0.803 <b>/el</b> 6.586 12.58 27.84 28.05	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Log  Assuming Lognormal Distribution DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t)	0.937 0.803 <b>evel</b> 1.256 0.846 14.67 14.87
· · · · · · · · · · · · · · · · · · ·	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	0.937 0.803 <b>evel</b> 1.256 0.846 14.67 14.87
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)	0.864 0.803 <b>rel</b> 6.586  12.58  27.84  28.05  22.71  27.28	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	0.937 0.803 <b>evel</b> 1.256 0.846 14.67 14.87 10.38 14.12
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)	0.864 0.803 <b>rel</b> 6.586  12.58  27.84  28.05  22.71  27.28	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z)	0.937 0.803 <b>evel</b> 1.256 0.846 14.67 14.87 10.38 14.12
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  99% Percentile (z)	0.864 0.803 <b>rel</b> 6.586  12.58  27.84  28.05  22.71  27.28	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z)	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method	0.864 0.803 <b>rel</b> 6.586 12.58 27.84 28.05 22.71 27.28 35.85	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean	0.864 0.803 <b>rel</b> 6.586 12.58 27.84 28.05 22.71 27.28 35.85	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution  Assuming Lognormal Distribution  DL/2 Substitution Method  Mean (Log Scale)  SD (Log Scale)  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Log ROS Method  Mean in Original Scale	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  SD  Maximum Likelihood Estimate(MLE) Method  Mean  SD	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) SD (ROS Method) Mean in Original Scale SD in Original Scale	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Porcentile (z) 10 ROS Method Mean in Original Scale SD in Original Scale	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  99% Percentile (z)  SD  Maximum Likelihood Estimate(MLE) Method  Mean  SD	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 5D in Original Scale 95% UTL with 90% Coverage 95% BCA UTL with 90% Coverage	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86 31.05
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97 70.78	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UTL 90% Percentile (z) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 10	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86 31.05 31.55
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97 70.78	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UTL 90% Percentile (z) 90% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 10	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86 31.05 31.55 20.2
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97 70.78	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 10 Percentile (z) 11 Percentile (z) 12 Percentile (z) 13 Percentile (z) 14 Percentile (z) 15 Percentile (z) 16 Percentile (z) 17 Percentile (z) 18 Percentile (z) 19 Percentile (z) 19 Percentile (z) 19 Percentile (z) 19 Percentile (z)	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86 31.05 31.55 20.2 12.84
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% UPL (t)	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97 70.78 71.08 63.03 69.92	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UTL 90% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 99% Percentile (z) 10	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86 31.05 31.55 20.2 12.84 18.92
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97 70.78 71.08 63.03 69.92	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 10 Percentile (z) 11 Percentile (z) 12 Percentile (z) 13 Percentile (z) 14 Percentile (z) 15 Percentile (z) 16 Percentile (z) 17 Percentile (z) 18 Percentile (z) 19 Percentile (z) 19 Percentile (z) 19 Percentile (z) 19 Percentile (z)	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86 31.05 31.55 20.2 12.84 18.92
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% UPL (t)  90% Percentile (z)	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97 70.78 71.08 63.03 69.92 82.85	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 10	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86 31.05 31.55 20.2 12.84 18.92 39.2
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97 70.78 63.03 69.92 82.85 6.00ly	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Log ROS Method Mean in Original Scale SD in Original Scale SD in Original Scale 95% UTL with 90% Coverage 95% BCA UTL with 90% Coverage 95% BCA UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z)	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86 31.05 31.55 20.2 12.84 18.92 39.2
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97 70.78 71.08 63.03 69.92 82.85 Only 0.848	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z) 99% Percentile (z) 10	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86 31.05 31.55 20.2 12.84 18.92 39.2
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  95% Percentile (z)  100 Percentile (z)	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97 70.78 71.08 63.03 69.92 82.85 Only 0.848 30.32	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Log ROS Method Mean in Original Scale SD in Original Scale SD in Original Scale 95% UTL with 90% Coverage 95% BCA UTL with 90% Coverage 95% BCA UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z)	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86 31.05 31.55 20.2 12.84 18.92 39.2
	5% Shapiro Wilk Critical Value  Data appear Normal at 5% Significance Lev  Assuming Normal Distribution  DL/2 Substitution Method  Mean  SD  95% UTL 90% Coverage  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  99% Percentile (z)  Maximum Likelihood Estimate(MLE) Method  Mean  SD  95% UTL with 90% Coverage  95% UPL (t)  90% Percentile (z)  95% UPL (t)  90% Percentile (z)  95% Percentile (z)  95% Percentile (z)	0.864 0.803 rel 6.586 12.58 27.84 28.05 22.71 27.28 35.85 38.73 18.97 70.78 71.08 63.03 69.92 82.85 Only 0.848 30.32	Shapiro Wilk Test Statistic 5% Shapiro Wilk Critical Value Data appear Lognormal at 5% Significance Lognormal at 5% Significance Lognormal Distribution  DL/2 Substitution Method Mean (Log Scale) SD (Log Scale) 95% UTL 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z) 99% Percentile (z)  Log ROS Method Mean in Original Scale SD in Original Scale SD in Original Scale 95% UTL with 90% Coverage 95% BCA UTL with 90% Coverage 95% BCA UTL with 90% Coverage 95% UPL (t) 90% Percentile (z) 95% Percentile (z) 95% Percentile (z)	0.937 0.803 evel 1.256 0.846 14.67 14.87 10.38 14.12 25.12 6.843 12.6 19.86 31.05 31.55 20.2 12.84 18.92 39.2
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7	Note: DL/2 is not a recommended method.					
*	PEST/PCB UG/KG TOXAPHENE  (br_na)					
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	T. IN. J. CO.		Statistics Number of Biotiset Observation	- 10		
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	If possible, compute and collect Data Qual  PEST/PCB UG/KG TOXAPHENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  PEST/PCB UG/KG TOXAPHENE  (so_ss)	General  O N/A  s data set the reliable CB UG/KC  O 10 obser lity Object  General	Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! alTOXAPHENE  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical result  Statistics  Number of Detected Data	s 0 s 100		
	If possible, compute and collect Data Qual  PEST/PCB UG/KG TOXAPHENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/Pounce  It is suggested to collect at least 8 to the suggested of the collect Data Qual  If possible, compute and collect Data Qual  PEST/PCB UG/KG TOXAPHENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data	General  O N/A  s data set the reliable CB UG/KC  O 10 obset lity Object  General  40  0	Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! alTOXAPHENE  (so_sb) was not processed!  rvations before using these statistical methods! ives (DQO) based sample size and analytical result  Statistics  Number of Detected Data	s 0 s 100		
1 2	If possible, compute and collect Data Qual  PEST/PCB UG/KG TOXAPHENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/Pounce  It is suggested to collect at least 8 to the least 8 to the least 8 to the least 8 to	General  O N/A  s data set the reliable CB UG/KC  O 10 obset lity Object  General  40  O (NDs), the other stati	Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! alTOXAPHENE  (so_sb) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical result  Statistics  Number of Detected Data Number of Non-Detect Data erefore all statistics and estimates should also be N stics are also NDs lying below the largest detection	s 0 s 100		
7	If possible, compute and collect Data Qual  PEST/PCB UG/KG TOXAPHENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/PCB  It is suggested to collect at least 8 to If possible, compute and collect Data Qual  PEST/PCB UG/KG TOXAPHENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects	General  O N/A  s data set the reliable CB UG/KC  O 10 obset lity Object  General  40  O (NDs), the other stati	Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! alTOXAPHENE  (so_sb) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical result  Statistics  Number of Detected Data Number of Non-Detect Data erefore all statistics and estimates should also be N stics are also NDs lying below the largest detection	s 0 s 100		
7	If possible, compute and collect Data Qual  PEST/PCB UG/KG TOXAPHENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/Pounce  It is suggested to collect at least 8 to the possible, compute and collect Data Qual  PEST/PCB UG/KG TOXAPHENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative sites	General  O N/A  s data set the reliable CB UG/KC  o 10 obset lity Object  General  40  0  (NDs), the other static	Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! alTOXAPHENE  (so_sb) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical result  statistics  Number of Detected Data Number of Non-Detect Data Reference all statistics and estimates should also be Nestics are also NDs lying below the largest detection values to estimate environmental parameters (e.g.,	s 0 s 100		
	If possible, compute and collect Data Qual  PEST/PCB UG/KG TOXAPHENE  (so_sb)  Total Number of Observations Tolerance Factor  Warning: This Data set is too small to compute the data set for variable PEST/Pounce  It is suggested to collect at least 8 to the possible, compute and collect Data Qual  PEST/PCB UG/KG TOXAPHENE  (so_ss)  Number of Valid Data Number of Distinct Detected Data  Warning: All observations are Non-Detects Specifically, sample mean, UCLs, UPLs, and The Project Team may decide to use alternative sites	General  O N/A  s data set the reliable CB UG/KC  o 10 obset lity Object  General  40  0  (NDs), the other static	Statistics  Number of Distinct Observations Number of Missing Values  only has 0 observations! and meaningful statistics and estimates! alTOXAPHENE  (so_sb) was not processed!  vations before using these statistical methods! ives (DQO) based sample size and analytical result  Statistics  Number of Detected Data Number of Non-Detect Data erefore all statistics and estimates should also be N stics are also NDs lying below the largest detection	s 0 s 100		

### TABLE 1

# UPPER PREDICTION LIMITS FOR SELECTED METALS BASEWIDE BACKGROUND STUDY NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

			Surface Soils		Subsurface Soils
	RIDEM Res DEC	UPL	UPL Statistic Type		Statistic Type
Aluminum	NC	16020	Nonparametric statistic - 95% UPL	13075	Nonparametric statistic - 95% UPL
Arsenic	7	13 <sup>1</sup>	Gamma distributed - 95% WH Approx. Gamma UPL	20 <sup>2</sup>	Nonparametric statistic - 95% UPL
Chromium	1400	16	Nonparametric statistic - 95% UPL	18	Normal distribution - 95% UPL
Cobalt	NC	8.89	Gamma distributed - 95% WH Approx. Gamma UPL	17	Nonparametric statistic - 95% UPL
Iron	NC	24200	Nonparametric statistic - 95% UPL	39173	Lognormal distribution - 95% UPL
Manganese	390	349	Lognormal distribution - 95% UPL	1037	Nonparametric statistic - 95% UPL

### NOTES:

NC = no criteria

UPL = Upper Prediction Limit

<sup>&</sup>lt;sup>1</sup> - Beach and Stissing Silt Loam datasets removed per RIDEM comment.

<sup>&</sup>lt;sup>2</sup> - Mansfield Mucky Silt Loam and Stidding Silt Loam datasets removed per RIDEM comment. Units are mg/kg.

## APPENDIX H FORMER USMC TRAILER LOCATION, FINAL SITE CLEANUP

### 04 June 2012

Former USMC Trailer Location, Coddington Cove Naval Station Newport Final Site Clean Up

### Clean Up Requirements

Final Clean Up requirements are based on inspection observations.

The intent of this document is to serve as the basis in developing a Statement of Work for a Design Build Contract for a project to execute the required final cleanup of the site.

### Site Information/Background:

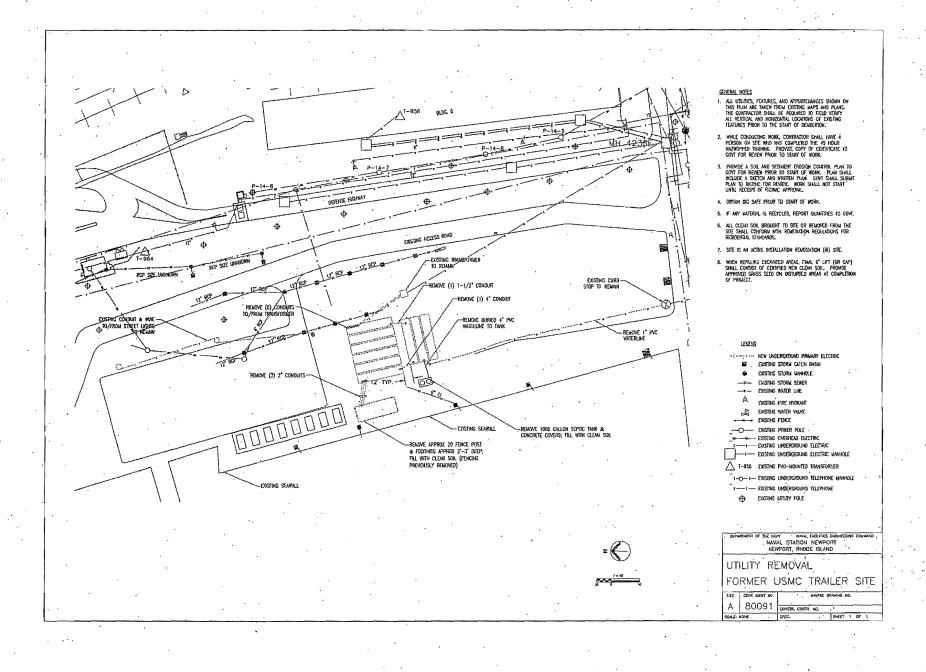
- 1. Site is an active Installation Remediation (IR) site.
- 2. Approx 3 years ago (Summer 2009), site had 2 feet of clean soil put down on the top of the site from another construction site on the installation
- 3. The site was then used for 2 years by the USMC, whereupon approximately 9 trailers were located and a parking lot of crushed stone were constructed.

### Clean Up requirements include:

- 1. Remove abandoned buried electrical conduits, water line, septic tank and piping, and fence posts.
- 2. While conducting work, contractor shall have a person on site full time who has completed the 40 hour Hazwopper training. Provide copy of certificate to Govt for review prior to start of work.
- Prior to start of work, provide a soil and sediment erosion control plan to Govt for review prior to start of work. Plan shall include a sketch and written plan. Govt shall submit plan to RI-CRMC for review. Work shall not start until receipt of RI-CRMC approval.
- 4. Obtain Dig Safe prior to start of work.
- 5. If any material is recycled, report quantities to Govt.
- 6. All clean soil brought to site or removed from the site shall conform with Remediation Regulations for Residential standards.
- 7. When refilling excavated areas, final 6" lift (or cap) shall consist of certified new clean soil.
- 8. Provide approved grass seed on disturbed areas at completion of project.

Refer to Sketch for approximate locations, quantities and sizes.

Cost Estimate - The Government Estimate is attached.



#### APPENDIX I HISTORIC DATASET

# TABLE ANALYTICAL RESULTS - GROUNDWATER (GW\_GW) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 of 8

SAMPLE ID	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-
	MW02-01	MW03-01	MW03-01- D	MW04-01	MW05-01	MW07-01	MW08-01	MW08-01- D	MW09-01	MW104- 01	MW11-01	MW12-01
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
	02	03	03	04	05	07	08	08	09	104	11	12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/L)												
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHANE												
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	10 U	10 J	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	40 U
BENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHAN E	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLORODIBROMOMETHAN E	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

# TABLE ANALYTICAL RESULTS - GROUNDWATER (GW\_GW) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 of 8

SAMPLE ID	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-
	MW02-01	MW03-01	MW03-01-	MW04-01	MW05-01	MW07-01	MW08-01	MW08-01-	MW09-01	MW104-	MW11-01	MW12-01
			D					D		01		
							DSY-MW-					
	02	03	03	04	05	07	08	08	09	104	11	12
······	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DICHLOROPROPENE												
ETHYLBENZENE	10 U	10 U		10 U	10 U	10 U		10 U			10 U	10 U
METHYLENE CHLORIDE	12 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
STYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL 1,2-	5 J	10 U	10 U	10 U	10 U	10 U	13	10 U	10 U	180	18	16
DICHLOROETHENE												
TOTAL XYLENES	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
TRANS-1,3- DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	10 U	32	33	10 U	10 U	10 U	4 J	10 U	3 J	10 U	10 U	16
VINYL CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U					
SEMIVOLATILES (UG/L)	10 0	10 0	10 0	10 0	10 0	10 0	10 0	10 0	10 0	100	10 0	10 0
1.2.4-TRICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-1 RICHLOROBENZENE	10 U		10 U	10 U	10 U	10 U	10 U	10 U	10 U			
,		10 U										
1,3-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U				
1,4-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U				
2,2'-OXYBIS(1- CHLOROPROPANE)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2.4.5-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U					
2,4,6-1 RICHLOROPHENOL  2.4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U		10 U				
2,4-DICHLOROPHENOL  2.4-DIMETHYLPHENOL	10 U	10 U	10 U		10 U	10 U	10 U					
, -				10 U								
2,4-DINITROPHENOL	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 U	25 UJ	25 UJ	25 U	25 U	25 UJ	25 UJ

CTO WE20

# TABLE ANALYTICAL RESULTS - GROUNDWATER (GW\_GW) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 of 8

SAMPLE ID	DSY-A-		DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-
	MW02-01	MW03-01	MW03-01- D	MW04-01	MW05-01	MW07-01	MW08-01	MW08-01- D	MW09-01	MW104- 01	MW11-01	MW12-01
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
	02	03	03	04	05	07	08	08	09	104	11	12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2-NITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-DICHLOROBENZIDINE	10 U	10 UJ	10 UJ	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
3-NITROANILINE	25 U	25 UJ	25 UJ	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U
4,6-DINITRO-2- METHYLPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-BROMOPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLORO-3- METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROANILINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-NITROANILINE	25 U	25 UJ	25 UJ	25 U	25 U	25 U	25 UJ	25 UJ	25 U	25 U	25 UJ	25 U
4-NITROPHENOL	25 UJ	25 U	25 U	25 UJ	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
ACENAPHTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

# TABLE ANALYTICAL RESULTS - GROUNDWATER (GW\_GW) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 of 8

SAMPLE ID	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-
	MW02-01	MW03-01	MW03-01-	MW04-01	MW05-01	MW07-01	MW08-01	MW08-01-	MW09-01	MW104-	MW11-01	MW12-01
			D					D		01		
LOCATION ID			DSY-MW-		DSY-MW-	DSY-MW-				DSY-MW-	DSY-MW-	
	02	03	03	04	05	07	08	08	09	104	11	12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
BIS(2-	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
CHLOROETHOXY)METHAN												
Е												
BIS(2-	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
CHLOROETHYL)ETHER BIS(2-	10 U	10 U	10 U	10 U	10 U	10 U	13 U	10 U				
ETHYLHEXYL)PHTHALATE	10 0	10 0	10 0	10 0	10 0	10 0	10 0	10 0	10 0	10 0	13 0	10 0
BUTYL BENZYL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PHTHALATE												
CARBAZOLE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
CHRYSENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
DIBENZO(A,H)ANTHRACEN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
Е												
DIBENZOFURAN	10 U	10 U	10 U			10 U	10 U				10 U	10 U
DIETHYL PHTHALATE	10 U	10 U	10 U	10 U		10 U	10 U				10 U	10 U
DIMETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
DI-N-OCTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
FLUORENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				

CTO WE20

# TABLE ANALYTICAL RESULTS - GROUNDWATER (GW\_GW) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 5 of 8

SAMPLE ID		DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-
	MW02-01	MW03-01	MW03-01- D	MW04-01	MW05-01	MW07-01	MW08-01	MW08-01- D	MW09-01	MW104- 01	MW11-01	MW12-01
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
	02	03	03	04	05	07	08	08	09	104	11	12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
HEXACHLOROCYCLOPENT ADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HIGH MOLECULAR WEIGHT PAHS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ISOPHORONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
LOW MOLECULAR WEIGHT PAHS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
NAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
NITROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSO-DI-N- PROPYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N- NITROSODIPHENYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PENTACHLOROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
PHENANTHRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL PAHS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PESTICIDES/PCBS (UG/L)												
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

CTO WE20

# TABLE ANALYTICAL RESULTS - GROUNDWATER (GW\_GW) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 6 of 8

SAMPLE ID	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-
· · · · · · · · · · · · · · · · · · ·	MW02-01	_	MW03-01-	_	MW05-01	_	_	MW08-01-	_	MW104-	_	MW12-01
			D					D		01		
LOCATION ID	DSY-MW-		DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-		DSY-MW-		DSY-MW-		
	02	03	03	04	05	07	08	08	09	104		12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
AROCLOR-1016	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR-1221	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
AROCLOR-1232	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR-1242	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR-1248	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR-1254	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR-1260	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN SULFATE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN KETONE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
METHOXYCHLOR	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
PCB-209	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SUM OF PCB CONGENERS X 2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

# TABLE ANALYTICAL RESULTS - GROUNDWATER (GW\_GW) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 7 of 8

SAMPLE ID	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-	DSY-A-
	MW02-01		MW03-01-		MW05-01		MW08-01	MW08-01-	MW09-01	MW104-	MW11-01	MW12-01
			D					D		01		
LOCATION ID			DSY-MW-								DSY-MW-	
	02	03	03	04	05	07	08	08	09	104	11	12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP		NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOXAPHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METALS (UG/L)												
ALUMINUM	48.8 U	227 U	59 U	43.9 U	16 U	1240	102 U	33.7 U	1010	88.9 U	100 U	66.5 U
ANTIMONY	52 U	52 UJ	52 UJ	52 U	52 U	52 U	52 U	52 U	52 U	52 U	52 UJ	52 U
ARSENIC	4 U	6.3 J	4.3 J	5.1 J	4 U	57.6	15.6	4 U	4 U	19.8	13.2	4 U
BARIUM	44.4	11.8 U	10.4 U	33.5 U	49.1	51.7	33.9 U	11.5 U	99.3	44.6	15.8	11.2 U
BERYLLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CADMIUM	3 U	3 UJ	3 UJ	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 UJ	3 U
CALCIUM	62500	25200	22100	80200	126000	14100	28400	34700	42000	46900	51300	22000
CHROMIUM	6 U	6 U	6 U	6 U	6 U	12.8 J	30.3 J	7.5 J	57.6 J	7.2 J	7.3 J	6 U
COBALT	3 U	5.4 UJ	3.6 UJ	3 U	3.9 UJ	4.5 UJ	18.5 UJ	3.4 UJ	7.8 UJ	12.3 UJ	4.5 UJ	3 U
COPPER	5 U	5.4 J	5.8 J	5 U	5 U	5 U	5 U	5 U	5.9 J	12.7	5 U	5 U
IRON	205 U	540 J	78.3 J	134 U	1260	18400	5660	140 U	2600	1880	414 J	216 U
LEAD	1 U	1 U	5.9 UJ	1 U	1 U	1.8 J	1 U	1 U	1 U	14.6	1 U	1 U
MAGNESIUM	31600	12600	11100	6700	40000	5430	6530	13400	12800	7470	13000	24000
MANGANESE	230	30	19.9 U	371	1360	753	3410	20.5	830	4300	373	125
MERCURY	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL	9 U	9 U	11.4 J	9 U	10.3 UJ	11.3 UJ	18.4 U	9 U	34.6 U	20.6 U	9.6 J	9 U
POTASSIUM	17100	2020	1780	3050	2490	3570	3990	1440	7650	3510	5890	15700
SELENIUM	4 U	4 UJ	4 UJ	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 UJ	4 U
SILVER	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ				
SODIUM	200000	75700	67100	29700	379000	142000	45000	32000	103000	119000	80100	60300
THALLIUM	6 U	6 UJ	6 UJ	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 UJ	6 U
VANADIUM	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
ZINC	68.3	23.7	19.9	17.3 U	3.9 UJ	26.4 U	33.6 U	52.1 U	22.4 U	14.2 U	21.3	15.2 U

#### TABLE ANALYTICAL RESULTS - GROUNDWATER (GW\_GW)

#### FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 8 of 8

SAMPLE ID	DSY-A- MW02-01	DSY-A- MW03-01	DSY-A- MW03-01- D	DSY-A- MW04-01	DSY-A- MW05-01	_	DSY-A- MW08-01	DSY-A- MW08-01- D		DSY-A- MW104- 01	_	DSY-A- MW12-01
LOCATION ID	DSY-MW- 02	DSY-MW- 03	DSY-MW- 03	DSY-MW- 04	DSY-MW- 05	_	DSY-MW- 08	DSY-MW- 08	DSY-MW- 09	DSY-MW- 104	_	DSY-MW- 12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MISCELLANEOUS PARAMETERS (UG/L)												
DIBUTYLTIN	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 U	1 UJ	1 U
MONOBUTYLTIN	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.16 J	1 UJ	1 U	1 UJ	1 U
TETRABUTYLTIN	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 U	1 UJ	1 U
TRIBUTYLTIN	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 U	1 UJ	1 U
PETROLEUM HYDROCARBONS (MG/L)				-								
CREOSOTE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U

# TABLE ANALYTICAL RESULTS - (SO\_NA) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 of 2

SAMPLE ID	TP14W-2	DSY-	DSY-	DSY-	DSY-	DSY-	DPSOIL0
		FDPB	FDPE	FDPN	FDPS	FDPW	4
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	14	25	25	25	25	25	DPSOIL
SAMPLE DATE	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/99
TOP DEPTH							
BOTTOM DEPTH							
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)							
TOLUENE	300	NA	NA	NA	NA	NA	NA
SEMIVOLATILES (UG/KG)							
ANTHRACENE	NA	NA	NA	NA	NA	NA	56 J
BENZO(A)ANTHRACENE	12000	NA	NA	NA	NA	NA	580
BENZO(A)PYRENE	10000	NA	NA	NA	NA	NA	560
BENZO(B)FLUORANTHENE	15000	NA	NA	NA	NA	NA	790
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	NA	300 J
BENZO(K)FLUORANTHENE	8200	NA	NA	NA	NA	NA	430
BIS(2-	NA	NA	NA	NA	NA	NA	160 J
ETHYLHEXYL)PHTHALATE							
CHRYSENE	12000		NA		NA	NA	620
DIBENZO(A,H)ANTHRACEN E	NA	NA	NA	NA	NA	NA	99 J
FLUORANTHENE	26000	NA	NA	NA	NA	NA	740
HIGH MOLECULAR WEIGHT PAHS	105200	NA	NA	NA	NA	NA	5239
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	290 J
PHENANTHRENE	20000	NA	NA	NA	NA	NA	200 J
PYRENE	22000	NA	NA	NA	NA	NA	830
TOTAL PAHS	125200	NA	NA	NA	NA	NA	5495
PESTICIDES/PCBS (UG/KG)							
TOTAL AROCLOR	900	NA	NA	NA	NA	NA	NA
METALS (MG/KG)							
ARSENIC	18.9	NA	NA	NA	NA	NA	NA

#### TABLE

#### ANALYTICAL RESULTS - (SO\_NA) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 of 2

SAMPLE ID	TP14W-2	DSY-	DSY-	DSY-	DSY-	DSY-	DPSOIL0
		FDPB	FDPE	FDPN	FDPS	FDPW	4
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	14	25	25	25	25	25	DPSOIL
SAMPLE DATE	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/99
TOP DEPTH							
BOTTOM DEPTH							
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM
BARIUM	71.7	NA	NA	NA	NA	NA	NA
CADMIUM	3.96	NA	NA	NA	NA	NA	NA
CHROMIUM	37.1	NA	NA	NA	NA	NA	NA
LEAD	334	NA	NA	NA	NA	NA	NA
SILVER	1.89	NA	NA	NA	NA	NA	NA
PETROLEUM							
HYDROCARBONS (MG/KG)							
TOTAL PETROLEUM	260	6.7	8.2	13	15	10	100
HYDROCARBONS							

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	MW02-	MW02-	MW03-	MW03-	MW04-	MW04-	MW04-	MW05-	MW05-	MW05-	MW05-	MW06-
	1820	2426	3436	0810	1618	0810	1618	3234	1012	2224	3234	4446	0406
LOCATION ID	DSY-MW-		DSY-MW-	DSY-MW-		DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-		DSY-MW-	DSY-MW-
	02	02	02	03	03	04	04	04	05	05	05	05	06
SAMPLE DATE	08/08/96	08/08/96		08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
1,1,2,2-	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TETRACHLOROETHANE													
1,1,2-TRICHLOROETHANE	12 U	_		13 U	_	12 U	14 U	11 U		13 U	_	12 U	_
1,1-DICHLOROETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
1,1-DICHLOROETHENE	12 U		_	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
1,2-DICHLOROETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
1,2-DICHLOROPROPANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
2-BUTANONE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
2-HEXANONE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
4-METHYL-2-PENTANONE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
ACETONE	12 U	11 U	12 U	29 U	11 U	12 U	14 U	11 U	33 U	18 U	14 U	13 U	11 U
BENZENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
BROMODICHLOROMETHAN E	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
BROMOFORM	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
BROMOMETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CARBON DISULFIDE	2 J	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CARBON TETRACHLORIDE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CHLOROBENZENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CHLORODIBROMOMETHAN E	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CHLOROETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 UJ	12 UJ	11 UJ
CHLOROFORM	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CHLOROMETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	MW02-	MW02-	MW03-	MW03-	MW04-	MW04-	MW04-	MW05-	MW05-	MW05-	MW05-	MW06-
	1820	2426	3436	0810	1618	0810	1618	3234	1012	2224	3234	4446	0406
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
	02	02	02	03	03	04	04	04	05	05	05	05	06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96		08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL		NORMAL	NORMAL		NORMAL			NORMAL	NORMAL		NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3- DICHLOROPROPENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
ETHYLBENZENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
METHYLENE CHLORIDE	12 U	17 U	18 U	13 U	11 U	18 U	22 U	19 U	12 U	17 U	17 U	34 U	22 U
STYRENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TETRACHLOROETHENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TOLUENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TOTAL 1,2- DICHLOROETHENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TOTAL XYLENES	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TRANS-1,3- DICHLOROPROPENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TRICHLOROETHENE	12 U	11 U	12 U	1 J	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
VINYL CHLORIDE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
1,2-DICHLOROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
1,3-DICHLOROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
1,4-DICHLOROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2,2'-OXYBIS(1- CHLOROPROPANE)	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2,4,5-TRICHLOROPHENOL	1100 U	920 U	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
2,4,6-TRICHLOROPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2,4-DICHLOROPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2,4-DIMETHYLPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 of 63

SAMPLE ID	DSY-S-					DSY-S-				DSY-S-		DSY-S-	DSY-S-
	_	-	_			MW04-	_	-		MW05-		MW05-	MW06-
LOCATION ID	1820	2426	3436	0810	1618	0810	1618	3234	1012	2224	3234	4446	0406
LOCATION ID	DSY-MW- 02	DSY-MW- 02	DSY-MW- 02	DSY-MW- 03	DSY-MW- 03	DSY-MW- 04	DSY-MW- 04	_	DSY-MW- 05	DSY-MW- 05	DSY-MW- 05	DSY-MW- 05	DSY-MW- 06
SAMPLE DATE	08/08/96	-	08/09/96	08/05/96		08/12/96	08/12/96	-		08/21/96		08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT		8 FT		8 FT	16 FT		10 FT	22 FT		44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	-	10 FT	18 FT		12 FT	24 FT	-		6 FT
SACODE	_	-		-	_	NORMAL	-	_			-	NORMAL	NORMAL
	NM		NM	NM	-	NM		_	NM	NM	_	NM	NM
2,4-DINITROPHENOL	1100 U	920 UJ	950 U	990 UJ	890 UJ	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
2,4-DINITROTOLUENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ		340 U	360 U	
2,6-DINITROTOLUENE	420 U	360 U	380 U	400 U	360 U	400 U		380 U	4000 UJ		340 U	360 U	
2-CHLORONAPHTHALENE	420 U	360 U	380 U	400 U	360 U		420 U		4000 UJ		340 U	360 U	
2-CHLOROPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U		4000 UJ		340 U	360 U	
2-METHYLNAPHTHALENE	420 U	360 U	380 U		360 U				4000 UJ		340 U	360 U	
2-METHYLPHENOL	420 U	360 U	380 U	400 U	360 U		420 U	380 U	4000 UJ	360 U	340 U	360 U	
2-NITROANILINE	1100 U	920 U	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
2-NITROPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
3,3'-DICHLOROBENZIDINE	420 U	360 UJ	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 UJ	360 UJ	360 U
3-NITROANILINE	1100 U	920 UJ	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
4,6-DINITRO-2- METHYLPHENOL	1100 U	920 U	950 U	990 UJ	890 UJ	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
4-BROMOPHENYL PHENYL ETHER	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
4-CHLORO-3- METHYLPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
4-CHLOROANILINE	420 UJ	360 UJ	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
4-CHLOROPHENYL PHENYL ETHER	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
4-METHYLPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
4-NITROANILINE	1100 U	920 UJ	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	MW02-	MW02-	MW03-		MW04-	MW04-		MW05-	MW05-	MW05-	MW05-	MW06-
	1820	2426	3436	0810	1618	0810	1618	3234	1012	2224	3234	4446	0406
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
	02	02	02	03	03	04	04	-	05	05	05	05	06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96		08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	920 U	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
ACENAPHTHENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
ACENAPHTHYLENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
ANTHRACENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BENZO(A)ANTHRACENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BENZO(A)PYRENE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BENZO(B)FLUORANTHENE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BENZO(G,H,I)PERYLENE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BENZO(K)FLUORANTHENE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BIS(2- CHLOROETHOXY)METHAN E	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BIS(2- CHLOROETHYL)ETHER	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BIS(2- ETHYLHEXYL)PHTHALATE	420 U	84 J	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BUTYL BENZYL PHTHALATE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
CARBAZOLE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
CHRYSENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
DIBENZO(A,H)ANTHRACEN E	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
DIBENZOFURAN	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
DIETHYL PHTHALATE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
DIMETHYL PHTHALATE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 5 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
· · · · · · · · · · · · · · · · · · ·		MW02-	MW02-			MW04-	MW04-	MW04-	MW05-	MW05-	MW05-	MW05-	MW06-
	1820	2426	3436	0810	1618	0810	1618	3234	1012	2224	3234	4446	0406
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
	02	02	02	03	03	04	04	04	05	05	05	05	06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	360 U	42 J	400 U	360 U	400 U	270 J	380 U	4000 UJ	360 U	340 U	360 U	360 U
DI-N-OCTYL PHTHALATE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
FLUORANTHENE	420 U	360 U	380 U	42 J	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
FLUORENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
HEXACHLOROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
HEXACHLOROBUTADIENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
HEXACHLOROCYCLOPENT ADIENE	420 U	360 U	380 UJ	400 U	360 U	400 U	420 U	380 UJ	4000 UJ	360 U	340 U	360 U	360 U
HEXACHLOROETHANE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
HIGH MOLECULAR WEIGHT PAHS	420 U	360 U	380 U	83	360 U	400 U	420 U	380 U	4000 U	360 U	340 U	360 U	360 U
INDENO(1,2,3-CD)PYRENE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
ISOPHORONE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
LOW MOLECULAR WEIGHT PAHS	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 U	360 U	340 U	360 U	360 U
NAPHTHALENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
NITROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
N-NITROSO-DI-N- PROPYLAMINE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
N- NITROSODIPHENYLAMINE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
PENTACHLOROPHENOL	1100 U	920 U	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
PHENANTHRENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
PHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
PYRENE	420 U	360 U	380 U	41 J	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 6 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-		MW02-			MW04-			MW05-	MW05-		MW05-	MW06-
	1820	2426	3436	0810	1618	0810	1618	3234	1012	2224	3234	4446	0406
LOCATION ID	DSY-MW-		DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-		DSY-MW-	DSY-MW-	-	DSY-MW-	DSY-MW-
SAMPLE DATE	02 08/08/96	02 08/08/96	02 08/09/96	03 08/05/96	03 08/05/96	04 08/12/96	04 08/12/96	=	05 08/21/96	05 08/21/96	05 08/23/96	05 08/23/96	06 08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT		10 FT	22 FT		06/23/96 44 FT	4 FT
-	20 FT	24 F T	36 FT	10 FT	18 FT	10 FT	18 FT		10 FT	24 FT	34 FT	44 FT 46 FT	6 FT
SACODE	NORMAL	_		NORMAL	_	NORMAL	_	_	NORMAL	NORMAL	_	NORMAL	NORMAL
QC TYPE	NM		NM	NM	NM	NM			NM	NM		NM	NM
TOTAL PAHS	420 U	360 U	380 U	83	360 U	400 U	420 U	380 U	4000 U	360 U	340 U	360 U	360 U
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0 R	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	0 R	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
4,4'-DDE	0 R	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	0 R	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
4,4'-DDT	4.3 U	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ALDRIN	2.2 U	1.9 U	1.9 U	2 U	1.8 U	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
ALPHA-BHC	2.2 U	1.9 U	1.9 U	2 U	1.8 U	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
ALPHA-CHLORDANE	0 R	1.9 U	1.9 U	2.1	1.8 U	2 U	0 R	1.9 UJ	2 U	1.9 U	1.7 U	1.9 U	1.9 U
AROCLOR-1016	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
AROCLOR-1221	85 U	74 U	76 U	80 U	72 U	79 U	83 U	75 U	79 U	72 U	68 U	72 U	73 U
AROCLOR-1232	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
AROCLOR-1242	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
AROCLOR-1248	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
AROCLOR-1254	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
AROCLOR-1260	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
BETA-BHC	2.2 U	1.9 U	1.9 U	2 U	1.8 U	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
DELTA-BHC	2.2 U	1.9 U	1.9 U	2 U	1.8 U	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
DIELDRIN	0 R	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	0 R	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ENDOSULFAN I	0 R	1.9 U	1.9 U	2 U	1.8 U	2 U	0 R	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
ENDOSULFAN II	0 R	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	0 R	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ENDOSULFAN SULFATE	4.3 U	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ENDRIN	0 R	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	0 R	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ENDRIN ALDEHYDE	4.3 U	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ENDRIN KETONE	4.3 U	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U

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# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 7 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-			MW03-		MW04-	MW04-		MW05-	MW05-		MW05-	MW06-
	1820	2426	3436	0810	1618	0810	1618	3234	1012	2224	3234	4446	0406
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
	02	02	02	03		04	04		05	05		05	06
SAMPLE DATE	08/08/96		08/09/96	08/05/96		08/12/96	08/12/96		08/21/96	08/21/96		08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT		8 FT	16 FT		10 FT	22 FT		44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	1.9 U	1.9 U	2 U	1.8 U	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
GAMMA-CHLORDANE	0 R	1.9 U	1.9 U	2.1	1.8 U	2 U	0 R	1.9 UJ	2 U	1.9 U	1.7 U	1.9 U	1.9 U
HEPTACHLOR	2.2 U	3.8	1.9 U	2 U	3.3	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
HEPTACHLOR EPOXIDE	0 R	1.9 U	1.9 U	2 U	1.8 U	2 U	0 R	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
METHOXYCHLOR	22 U	19 U	19 U	20 U	18 U	20 U	21 U	19 U	20 U	19 U	17 U	19 U	19 U
PCB-209	4.3 U	3.7 U	3.8 U	3.9 UJ	3.6 UJ	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
SUM OF PCB CONGENERS X 2	4.3 U	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	220 U	190 U	190 U	200 U	180 U	200 U	210 U	190 U	200 U	190 U	170 U	190 U	190 U
METALS (MG/KG)													
ALUMINUM	4890	7320	18200	4400 J	11100 J	2430	6000	10100	6490	4820	6840	6990	19900
ANTIMONY	11.8 UJ	11.7 UJ	11.6 UJ	12.6 U	11.3 U	11.9 UJ	12.2 UJ	11 UJ	11.4 UJ	9.3 UJ	11 UJ	11.3 UJ	17.6 UJ
ARSENIC	4.3	4	6.6	7	9.9	3	7.3	4.9	7.1 J	6.3 J	8	4.1 U	11.1
BARIUM	3.2	7.6	7.1	7.5	9	2.6 U	3.9	6.6	12.6 J	2.6 UJ	14.7	14.3	5.5 J
BERYLLIUM	0.23 U	0.23 U	0.33 J	0.24 U	0.23 J	0.23 U	0.23 U	0.21 U	0.3 J	0.18 UJ	0.22	0.23	0.34 U
CADMIUM	0.68 U	0.68 U	0.67 U	0.73 U	0.65 U	0.69 U	0.7 U	0.63 U	0.66 UJ	0.54 UJ	0.64 U	0.65 U	1 U
CALCIUM	3480	1140	2170	662	1210	852	1500	1430	1630	577	1380	1230	784
CHROMIUM	10.9 J	12.3	27.1 J	10.3	18.1	6 UJ	10.7 J	18.2 J	8.7 J	7.7 J	11.7 J	10.4 J	25.6 J
COBALT	5.2	7.1	19.8	6.7	15.4	2.6 U	5.9	9.6	7.3 J	3.9 J	10.2	6.7	24
COPPER	8.6	11.4	30.9	11.5 J	23.5	5 U	10.6	24.1	13.9 J	5.1 J	15	10	21.2
IRON	13500	18600	40600	15500 J	26800 J	7440	17000	24100	16100	14300	20500	14500	43600
LEAD	6 J	3.1 J	10 J	2.7	29.2	2.1 J	8.3 J	23.4 J	12.8 J	2.1 J	4.3 J	3.9 J	13.3 J
MAGNESIUM	1950	2980	7680	1660	3870	921	2170	4380	2570	1900	2890	2730	7130
MANGANESE	97.9	159 J	385	113	370	89.2	149	155	310 J	86.2 J	227	156	495

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# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 8 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
_	MW02-	MW02-	MW02-	MW03-	MW03-	MW04-	MW04-	MW04-	MW05-	MW05-	MW05-	MW05-	MW06-
	1820	2426	3436	0810	1618	0810	1618	3234	1012	2224	3234	4446	0406
	DSY-MW-	_	_	DSY-MW-	_	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	_	DSY-MW-	DSY-MW-
	02	02	02	03	03	04	04	=	05	05	05	05	06
· · · · · · · · · · · · · · · · · · ·	08/08/96			08/05/96		08/12/96	08/12/96			08/21/96		08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	-	8 FT	-	8 FT	16 FT	_	10 FT	22 FT	_	44 FT	4 FT
	20 FT	26 FT	36 FT	10 FT		10 FT	18 FT	•	12 FT	24 FT		46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	0.06 U	0.06 U	0.07	0.05 U	0.05 U	0.06 U	0.05 U	0.06 U	0.05 U	0.05 U	0.06 U	0.05 U
NICKEL	8.9	15.8 J	39.5	12 J	22.7 J	5.5	11.9	24.9	13.4 J	10.4 J	16.9	13.9	
POTASSIUM	191	658	286	355	331	169	176	248	378	190	547	473	166
SELENIUM	0.91 UJ	1.2 J	1 J	0.97 U	0.87 U	0.92 UJ	0.94 UJ	1.1 J	0 R	0 R	0.85 U	0.87 U	0.68 U
SILVER	1.4 UJ	1.4 UJ	1.3 UJ	1.5 UJ	1.3 UJ	1.4 UJ	1.4 UJ	1.3 UJ	1.3 UJ	1.1 UJ	1.3 UJ	1.3 UJ	2 UJ
SODIUM	66.3 U	147 U	31.7 U	51.2 U	52.6 U	28.5 U	37.4 U	97.5 U	47 U	40.5 U	68.3 U	70.3 U	0 R
THALLIUM	1.4 U	1.4 UJ	1.3 U	1.5 UJ	1.3 UJ	1.4 U	1.4 U	1.3 U	0 R	0 R	1.3 UJ	1.3 UJ	1 UJ
VANADIUM	11	12.9	17.2 J	11	19.3 J	5.5	11.5	10.9 J	8.9	10.5	10.9	10.9	17.7
ZINC	37	35.4	71.3	30.8	52.8	13.7	37.9	50.1	31.9 J	31.3 J	37.9 J	31.1 J	72 J
MISCELLANEOUS													
PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	49 U	49 U	49 U	49 U	50 U	49 U		50 U	49 U	50 U	50 U	
MONOBUTYLTIN	50 U	49 U	49 U	49 U	49 U	50 U	49 U	49 UJ	50 U	49 U	50 U	50 U	
TETRABUTYLTIN	50 U	49 U	49 U	49 U	49 U	50 U	49 U		50 U	49 U	50 U	50 U	
TRIBUTYLTIN	2.2 J	49 U	1.4 J	49 U	2.9 J	50 U	49 U	49 U	4.9 J	49 U	50 U	50 U	50 U
PETROLEUM													
HYDROCARBONS (MG/KG)													
CREOSOTE	76 U	79 UJ	66 U	100 U	91 U	73 U	89	72 U	4100	72 U	67 U	67 U	83
TOTAL PETROLEUM	NA	NA	NA	NA	NA		NA NA	NA	NA	NA	NA	NA	
HYDROCARBONS	IVA	IVA	INA	IVA	IVA	I IVA	IVA	INA	IVA	IVA	INA	INA	I IVA
TCLP METALS (UG/L)													
ARSENIC	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	8.8	4 U	4 U	4 U	4 U
BARIUM	53.8	373	352	78.3 U	114 U	307	250	415	806 U	693 U	184 U	122 U	55 U
CADMIUM	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 9 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	MW02-	MW02-	MW03-	MW03-	MW04-	MW04-	MW04-	MW05-	MW05-	MW05-	MW05-	MW06-
	1820	2426	3436	0810	1618	0810	1618	3234	1012	2224	3234	4446	0406
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
	02	02	02	03	03	04	04	04	05	05	05	05	06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	6 U	6 U	6 U	6 U	6 U	6 U	7.4 J	21.5	8.5 J	6 U	6 U	6 U
LEAD	24.7	1 U	48.8	1 U	1 U	1 U	45.4	12.2	23.5	2.4 U	3 UJ	1 U	5.1 UJ
MERCURY	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 UJ	0.1 U	0.1 U	0.1 U	0.1 U
SELENIUM	4 U	4 U	4 U	4 U	4 U	4 U	4 U	6.9 U	4 U	4 U	4 U	6.7 U	4 U
SILVER	6 U	6 U	6 U	6 UJ	6 UJ	7.5 UJ	6 U	7.8 UJ	6 UJ	6 UJ	6 U	6 U	8.6 UJ

#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 10 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	MW07-	MW07-	MW07-	MW07-	MW07-	MW08-	MW09-	MW09-	MW09-	MW09-	MW09-	MW11-
	1820	0810	1618	1618-D	2224	3436	0810	1012	1012-D	2022	3032	3638	1113
LOCATION ID	DSY-MW-		DSY-MW-	_		DSY-MW-	_	_	_	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
	02	07	07	07	07	07	08		09	09	09	09	11
SAMPLE DATE	08/08/96		08/14/96	08/14/96		08/15/96	08/27/96		08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
1,1,2,2-	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
TETRACHLOROETHANE													
1,1,2-TRICHLOROETHANE	12 U	11 U			12 U			10 U			12 U		
1,1-DICHLOROETHANE	12 U	11 U	12 U	12 U	12 U	11 U			11 U		12 U	11 U	12 U
1,1-DICHLOROETHENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
1,2-DICHLOROPROPANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
2-BUTANONE	12 U	11 U	12 U	18 U	12 U	11 U	11 U	15 U	11 U	15 U	12 U	11 U	12 U
2-HEXANONE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
4-METHYL-2-PENTANONE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
ACETONE	12 U	25 U	39 U	45 U	23 U	11 U	11 U	10 U	11 U	20 U	13 U	11 U	150 U
BENZENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
BROMODICHLOROMETHAN E	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
BROMOFORM	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
BROMOMETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
CARBON DISULFIDE	2 J	11 U	12 U	12 U	4 J	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
CARBON TETRACHLORIDE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
CHLOROBENZENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
CHLORODIBROMOMETHAN E	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
CHLOROETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 UJ	10 UJ	11 UJ	11 UJ	12 UJ	11 UJ	12 U
CHLOROFORM	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
CHLOROMETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U

#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 11 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	MW07-	MW07-	MW07-	MW07-	MW07-	MW08-	MW09-	MW09-	MW09-	MW09-	MW09-	MW11-
	1820	0810	1618	1618-D	2224	3436	0810	1012	1012-D	2022	3032	3638	1113
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-		DSY-MW-	DSY-MW-
	02	07	07	07	07	07	08		09	09	09	09	11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
DICHLOROPROPENE													
ETHYLBENZENE	12 U	11 U		12 U	12 U				11 U	11 U	12 UJ	11 U	_
METHYLENE CHLORIDE	12 U	18 U	13 U	12 U	15 U	13 U		17 U	14 U	33 U	37 U	16 U	
STYRENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U		11 U	11 U	12 UJ	11 U	
TETRACHLOROETHENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
TOLUENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
TOTAL 1,2-	12 U	11 U	12 U	12 U	12 U	11 U	3 J	10 U	1 J	11 U	12 U	11 U	12 U
DICHLOROETHENE													
TOTAL XYLENES	12 U	11 U	12 U	12 U	12 U	11 U		10 U	11 U	11 U	12 UJ	11 U	
TRANS-1,3- DICHLOROPROPENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
TRICHLOROETHENE	12 U	11 U	12 U	12 U	12 U	11 U	3 J	10 U	11 U	11 U	12 U	11 U	12 U
VINYL CHLORIDE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
1,2-DICHLOROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
1,3-DICHLOROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
1,4-DICHLOROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2,2'-OXYBIS(1- CHLOROPROPANE)	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2,4,5-TRICHLOROPHENOL	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
2,4,6-TRICHLOROPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2,4-DICHLOROPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2,4-DIMETHYLPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 12 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
l l	MW02-	MW07-	MW07-	MW07-	MW07-	MW07-	MW08-	MW09-	MW09-	MW09-	MW09-	MW09-	MW11-
	1820	0810	1618	1618-D	2224	3436	0810	1012	1012-D	2022	3032	3638	1113
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
[0	02	07	07	07	07	07	08	09	09		09	09	11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 UJ	910 U	890 U
2,4-DINITROTOLUENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2,6-DINITROTOLUENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2-CHLORONAPHTHALENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2-CHLOROPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2-METHYLNAPHTHALENE	420 U	280 J	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2-METHYLPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2-NITROANILINE	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
2-NITROPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
3,3'-DICHLOROBENZIDINE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 UJ	360 U	350 U
3-NITROANILINE	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
4,6-DINITRO-2- METHYLPHENOL	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
4-BROMOPHENYL PHENYL ETHER	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
4-CHLORO-3- METHYLPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
4-CHLOROANILINE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
4-CHLOROPHENYL PHENYL ETHER	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
4-METHYLPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
4-NITROANILINE	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U

#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 13 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	MW07-	MW07-	MW07-		MW07-	MW08-	MW09-	MW09-			MW09-	MW11-
	1820	0810	1618	1618-D	2224	3436	0810	1012	1012-D	2022	3032	3638	1113
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
	02	07	07	07	07	07	80	09	09		09	09	11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
ACENAPHTHENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
ACENAPHTHYLENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
ANTHRACENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
BENZO(A)ANTHRACENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	53 J	70 J	370 UJ	380 U	360 U	350 U
BENZO(A)PYRENE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	41 J	42 J	370 UJ	380 U	360 U	350 U
BENZO(B)FLUORANTHENE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	63 J	390 UJ	370 UJ	380 U	360 U	350 U
BENZO(G,H,I)PERYLENE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
BENZO(K)FLUORANTHENE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
BIS(2- CHLOROETHOXY)METHAN E	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
BIS(2- CHLOROETHYL)ETHER	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
BIS(2- ETHYLHEXYL)PHTHALATE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	400 UJ	380 U	360 U	350 U
BUTYL BENZYL PHTHALATE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
CARBAZOLE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
CHRYSENE	420 U	370 UJ	51 J	390 UJ	380 UJ	380 UJ	340 UJ	54 J	41 J	370 UJ	380 U	360 U	350 U
DIBENZO(A,H)ANTHRACEN E	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
DIBENZOFURAN	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
DIETHYL PHTHALATE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
DIMETHYL PHTHALATE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U

#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 14 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	MW07-	MW07-	MW07-	MW07-	MW07-	MW08-	MW09-	MW09-	MW09-	MW09-	MW09-	MW11-
	1820	0810	1618	1618-D	2224	3436	0810	1012	1012-D	2022	3032	3638	1113
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
		07	07	07	07	07	08	09	09	09	09	09	11
SAMPLE DATE	08/08/96	08/14/96			08/14/96	08/15/96	08/27/96		08/28/96		08/29/96	08/29/96	08/01/96
TOP DEPTH		8 FT	_	16 FT	22 FT	-	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT		24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
DI-N-OCTYL PHTHALATE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
FLUORANTHENE	420 U	370 UJ	49 J	49 J	380 UJ	380 UJ	100 J	130 J	130 J	370 UJ	380 U	360 U	350 U
FLUORENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
HEXACHLOROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
HEXACHLOROBUTADIENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
HEXACHLOROCYCLOPENT ADIENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
HEXACHLOROETHANE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
HIGH MOLECULAR WEIGHT PAHS	420 U	370 U	142	94	380 U	380 U	200	439	413	370 U	380 U	360 U	350 U
INDENO(1,2,3-CD)PYRENE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
ISOPHORONE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
LOW MOLECULAR WEIGHT PAHS	420 U	377	360 U	390 U	380 U	380 U	51	81	74	370 U	380 U	360 U	350 U
NAPHTHALENE	420 U	49 J	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
NITROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
N-NITROSO-DI-N- PROPYLAMINE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
N- NITROSODIPHENYLAMINE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
PENTACHLOROPHENOL	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
PHENANTHRENE	420 U	48 J	360 UJ	390 UJ	380 UJ	380 UJ	51 J	81 J	74 J	370 UJ	380 U	360 U	350 U
PHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
PYRENE	420 U	370 UJ	42 J	45 J	380 UJ	380 UJ	100 J	98 J	130 J	370 UJ	380 U	360 U	350 U

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#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 15 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-					MW07-			MW09-	MW09-	MW09-	MW09-	MW11-
	1820	0810	1618	1618-D	2224	3436	0810		1012-D	2022	3032	3638	1113
LOCATION ID	DSY-MW-	_		DSY-MW-	_	DSY-MW-	DSY-MW-	_	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
SAMPLE DATE	02 08/08/96	07 08/14/96	07 08/14/96	07 08/14/96	07 08/14/96	07 08/15/96	08 08/27/96		09 08/28/96	09 08/28/96	09 08/29/96	09 08/29/96	11 08/01/96
TOP DEPTH	18 FT	8 FT		16 FT	22 FT	34 FT	8 FT		10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT		18 FT	24 FT	36 FT	10 FT	-	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL			DUP		NORMAL	NORMAL		DUP	NORMAL	_	NORMAL	ORIG
	NM					NM	NM		NM	NM	NM	NM	NM
TOTAL PAHS	420 U	377	142	94	380 U			520		370 U	380 U	360 U	
PESTICIDES/PCBS (UG/KG)	420 0	311	142	34	300 0	360 0	231	520	407	370 0	360 0	300 0	330 0
PESTICIDES/PCB3 (UG/RG)													
4,4'-DDD	0 R	3.7 UJ	3.6 UJ	220 J	28 J	7.4 J	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
4,4'-DDE	0 R	3.7 UJ	3.6 UJ	11 J	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
4,4'-DDT	4.3 U	3.7 UJ	3.6 UJ	100 J	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
ALDRIN	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
ALPHA-BHC	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
ALPHA-CHLORDANE	0 R	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
AROCLOR-1016	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
AROCLOR-1221	85 U	73 UJ	73 UJ	76 UJ	76 UJ	75 UJ	68 UJ	76 UJ	78 UJ	74 UJ	76 U	72 U	73 U
AROCLOR-1232	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
AROCLOR-1242	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
AROCLOR-1248	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
AROCLOR-1254	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
AROCLOR-1260	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
BETA-BHC	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
DELTA-BHC	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	
DIELDRIN	0 R	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	
ENDOSULFAN I	0 R	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	
ENDOSULFAN II	0 R	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	
ENDOSULFAN SULFATE	4.3 U	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	
ENDRIN	0 R	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	
ENDRIN ALDEHYDE	4.3 U	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	
ENDRIN KETONE	4.3 U	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U

#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 16 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	MW07-	MW07-	MW07-	MW07-	MW07-	MW08-	MW09-	MW09-	MW09-	MW09-	MW09-	MW11-
	1820	0810	1618	1618-D	2224	3436	0810	1012	1012-D	2022	3032	3638	1113
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-		DSY-MW-	DSY-MW-
	02	07	07	07	07	07	08		09	09	09	09	11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96		08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
GAMMA-CHLORDANE	0 R	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
HEPTACHLOR	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	2.4
HEPTACHLOR EPOXIDE	0 R	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
METHOXYCHLOR	22 U	19 UJ	19 UJ	20 UJ	20 UJ	19 UJ	17 UJ	20 UJ	20 UJ	19 UJ	20 U	19 U	18 U
PCB-209	4.3 U	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
SUM OF PCB CONGENERS X 2	4.3 U	3.7 U	3.6 U	3.8 U	3.8 U	3.8 U	3.4 U	3.8 U	3.9 U	3.7 U	3.8 U	3.6 U	3.6 U
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	220 U	190 UJ	190 UJ	200 UJ	200 UJ	190 UJ	170 UJ	200 UJ	200 UJ	190 UJ	200 U	190 U	180 U
METALS (MG/KG)													
ALUMINUM	4890	8890	10100	8820	5800	7350	11200	10400	6960	11100	16300	16700	6260 J
ANTIMONY	11.8 UJ	9.1 UJ	10.4 UJ	8.8 UJ	11.2 UJ	9.6 UJ	11.7 UJ	10.5 UJ	10.4 UJ	10.1 UJ	11 UJ	10.7 UJ	11.3 U
ARSENIC	4.3	20.3	20.9	18.4	5	3.9	20.7	17.8	19	9.8	9.7	4.4	3.3
BARIUM	3.2	17.2	15.7	13.2	4.1 U	13.2	9.3 J	10.5 J	9.3 J	17.7 J	3.1	4.7 J	15.1
BERYLLIUM	0.23 U	0.41 J	0.38 J	0.38 J	0.21 U	0.26 J	0.3	0.32	0.31	0.3	0.21 U	0.21	0.23 J
CADMIUM	0.68 U	0.52 U	0.6 U	0.51 U	0.64 U	0.55 U	0.67 U	0.61 U	0.6 U	0.58 U	0.64 U	0.62 U	0.65 U
CALCIUM	3480	374 J	830 J	776 J	596 J	1430 J	1190	1020	742	1900	1900	5190	437
CHROMIUM	10.9 J	10.5	12.3	11	8.2	10.3	16.1 J	16.3 J	10.6 J	16.5 J	21.6 J	20.8 J	7.8 U
COBALT	5.2	10.2	11.4	11.4	4.6	6.4	13.7	11.2	8.8	13	15.9	16.1	5.4
COPPER	8.6	17.3	17.4	17.5	5.9	11.4	23.9	23.2	18.6	16.2	30.9	41.5	14 J
IRON	13500	25200	28400	26200	15100	15100	30200	31000	28200	31800	36800	40400	12800 J
LEAD	6 J	7.6 J	37.1 J	35.1 J	2.6 J	4.5 J	17.3 J	24.2 J	23.8 J	6.8 J	17.8 J	3.1 J	6.6
MAGNESIUM	1950	2220	3040	2680	2210	2920	3650	3570	2200	4600	6830	8000	1600
MANGANESE	97.9	396	364	336	92.5	147	502	251	246	462	391	728	180

#### **TABLE** ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 17 of 63

· · · · · · · · · · · · · · · · · · ·			DSY-S-	DSY-S-		DSY-S-			DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
			MW07-	MW07- 1618-D		MW07-				MW09-		MW09-	MW11-
			1618 DSY-MW-			3436 DSY-MW-	0810 DSY-MW-	_		2022 DSY-MW-	3032 DSY-MW-	3638 DSY-MW-	1113 DSY-MW-
	_	_	07	07	_	07	08 Y-IVIVV-	_	09 Y-WW-	09	_	09	11
	-	-		08/14/96	=	08/15/96				08/28/96		08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT		20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	0.07	0.05 U	0.15	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.05 U	0.05
NICKEL	8.9	18.8	20.7	20.1	11.5	13.9	24.5	20.9	17.2	25.3	32.5	33.2	11 J
POTASSIUM	191	289	224	179 U	309	566	227	342	265	593	108	145	274
SELENIUM	0.91 UJ	0.7 U	0.8 U	0.68 U	0.86 U	0.74 U	0.9 U	0.81 U	0.8 U	0.77 U	0.85 U	0.83 U	0.87 U
SILVER	1.4 UJ	1 UJ	1.2 UJ	1 UJ	1.3 UJ	1.1 UJ	1.3 UJ	1.2 UJ	1.2 UJ	1.2 UJ	1.3 UJ	1.2 UJ	1.3 UJ
SODIUM	66.3 U	21.4 UJ	46.7 U	34.8 U	43.5 U	228	55.4 UJ	57.5 UJ	68.8 UJ	68.2 UJ	17 U	0 R	54.5 U
THALLIUM	1.4 U	1 UJ	1.2 UJ	1 UJ	1.3 UJ	1.1 UJ	1.3 UJ	1.2 UJ	1.2 UJ	1.2 UJ	1.3 UJ	1.2 UJ	1.3 UJ
VANADIUM	11	13	13.7	11.7	12.3	11.5	13.1	17.5	11.7	15.2	13.4	12.3	8.4
ZINC	37	40.6 J	60.1 J	58.6 J	28 J	32.2 J	59 J	73 J	67.3 J	63.2 J	66.3 J	53.8 J	25.5
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	50 U	50 U	49 U	49 U	50 U	49 UJ	49 UJ	50 UJ	50 UJ	50 U	50 U	49 U
MONOBUTYLTIN	50 U	50 UJ	50 U	49 U	49 U	50 U	49 UJ	49 UJ	50 UJ	50 UJ	50 U	50 U	49 U
TETRABUTYLTIN	50 U	50 UJ	50 U	49 U	49 U	50 U	49 UJ	49 UJ	50 UJ	50 UJ	50 U	50 U	49 U
TRIBUTYLTIN	2.2 J	50 U	50 U	49 U	49 U	50 U	49 UJ	49 UJ	50 UJ	50 UJ	50 U	50 U	3.6 J
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	76 U	160	72 U	74 U	74 U	70 U	490	73 UJ	72 J	70 U	75 U	69 U	75 UJ
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	18.6	24.6	26.8	4.2 J	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
BARIUM	53.8	710 U	514 U	681 U	340 U	613 U	61.5 U	92.1 U	77.5 U	83.8 U	69.6 U	91.6 U	337 U
CADMIUM	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U

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#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 18 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	MW07-	MW07-	MW07-	MW07-	MW07-	MW08-	MW09-	MW09-	MW09-	MW09-	MW09-	MW11-
	1820	0810	1618	1618-D	2224	3436	0810	1012	1012-D	2022	3032	3638	1113
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-
	02	07	07	07	07	07	08	09	09	09	09	09	11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	7.3 J	6 U	6 U	6 U	14.6	6 U	6 U	6 U	6 U	6 U	6 U	6 U
LEAD	24.7	1.8 UJ	37.1 U	38.1 U	1.8 UJ	1 U	2.6 UJ	15.8 J	21.8 J	1.9 UJ	5.4 UJ	2.8 UJ	2.3 U
MERCURY	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SELENIUM	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
SILVER	6 U	6 U	6 U	6 U	6 U	8.1 UJ	6 U	6 U	6 U	6 U	6 U	6 U	6 UJ

#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 19 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	N1-0	N1-100	N1-150	N1-200
	MW02-	MW11-	MW11-	MW11-	MW11-	MW11-	MW12-		MW12-				
	1820	1113-D	2729	0103	2931	2931-D	SS12	SS16	SS05				
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
	02	11	11	11	11	11	12	12	12	5	5	5	5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96		08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,1,2,2- TETRACHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,1-DICHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,1-DICHLOROETHENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,2-DICHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,2-DICHLOROPROPANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
2-BUTANONE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
2-HEXANONE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
4-METHYL-2-PENTANONE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
ACETONE	12 U	110 U	77 U	75 U	240	270 U	11 U	11 U	11 U	7 B	52 B	26 B	24 B
BENZENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
BROMODICHLOROMETHAN E	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
BROMOFORM	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
BROMOMETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CARBON DISULFIDE	2 J	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CARBON TETRACHLORIDE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CHLOROBENZENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CHLORODIBROMOMETHAN E	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CHLOROFORM	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CHLOROMETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA

#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 20 of 63

SAMPLE ID	DSY-S- MW02-	DSY-S- MW11-		DSY-S- MW11-		DSY-S- MW11-	DSY-S- MW12-	DSY-S- MW12-	DSY-S- MW12-	N1-0	N1-100	N1-150	N1-200
	1820	1113-D		0103	2931	2931-D	SS12	SS16	SS05				
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
	02	11	11	11	11	11	12	12	12	5	5	5	5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3- DICHLOROPROPENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
ETHYLBENZENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
METHYLENE CHLORIDE	12 U	22 U		18 U	23 U			13 U	14 U	NA NA	NA NA	NA NA	
STYRENE	12 U	12 U	_	10 U	13 U						NA NA	NA NA	
TETRACHLOROETHENE	12 U	12 U		11 U	13 U		_	_	_				
TOLUENE	12 U	12 U		11 U	13 U		_	_	11 U	NA NA	NA NA	NA	
TOTAL 1,2-	12 U	12 U	13 U	11 U	1 J	5 J	11 U	_	11 U	NA NA	NA NA	NA	
DICHLOROETHENE	'2 0	12 0	10 0	'''		0 0	'' "	'' '					1.7.
TOTAL XYLENES	12 U	12 U	13 U	2 J	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
TRANS-1,3- DICHLOROPROPENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
TRICHLOROETHENE	12 U	12 U	2 J	11 U	4 J	4 J	11 U	11 U	11 U	NA	NA	NA	NA
VINYL CHLORIDE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
1,2-DICHLOROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
1,3-DICHLOROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
1,4-DICHLOROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2,2'-OXYBIS(1- CHLOROPROPANE)	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 U	890 U	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2,4-DICHLOROPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	
2,4-DIMETHYLPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA

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#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 21 of 63

SAMPLE ID	MW02- 1820	MW11- 1113-D	MW11- 2729	MW11- 0103	MW11- 2931	DSY-S- MW11- 2931-D	MW12- SS12	MW12- SS16	MW12- SS05				N1-200
LOCATION ID	DSY-MW- 02	DSY-MW- 11	DSY-MW- 11	DSY-MW- 11	DSY-MW- 11	DSY-MW-	DSY-MW- 12	DSY-MW- 12	DSY-MW- 12	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96		08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	890 UJ	940 U	880 U	960 UJ	900 UJ	0 R	960 U	890 U	NA	NA	NA	NA
2,4-DINITROTOLUENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2,6-DINITROTOLUENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2-CHLORONAPHTHALENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2-CHLOROPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2-METHYLNAPHTHALENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2-METHYLPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2-NITROANILINE	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 U	890 U	NA	NA	NA	NA
2-NITROPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	420 U	350 U	370 U	350 U	380 U	360 U	330 UJ	380 UJ	350 UJ	NA	NA	NA	NA
3-NITROANILINE	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 U	890 U	NA	NA	NA	NA
4,6-DINITRO-2- METHYLPHENOL	1100 U	890 U	940 U	880 U	960 U	900 UJ	0 R	960 U	890 U	NA	NA	NA	NA
4-BROMOPHENYL PHENYL ETHER	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
4-CHLORO-3- METHYLPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
4-CHLOROANILINE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
4-CHLOROPHENYL PHENYL ETHER	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
4-METHYLPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
4-NITROANILINE	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 UJ	890 UJ	NA	NA	NA	NA

#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 22 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	N1-0	N1-100	N1-150	N1-200
	MW02-	MW11-	MW11-	MW11-	MW11-	MW11-	MW12-	MW12-	MW12-				
	1820	1113-D	2729	0103	2931	2931-D	SS12	SS16	SS05				
LOCATION ID	DSY-MW-	DSY-MW-		DSY-MW-		DSY-MW-	DSY-MW-		_	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
	02	11	11	11	11	11	12	12	12	5	5	5	5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 U	890 U	NA	NA	NA	NA
ACENAPHTHENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
ACENAPHTHYLENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
ANTHRACENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	48 J	NA	NA
BENZO(A)ANTHRACENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	140 J	64 J	NA
BENZO(A)PYRENE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	140 J	54 J	NA
BENZO(B)FLUORANTHENE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	170 J	63 J	NA
BENZO(G,H,I)PERYLENE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	56 J	NA	NA
BENZO(K)FLUORANTHENE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	84 J	42 J	NA
BIS(2- CHLOROETHOXY)METHAN E	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
BIS(2- CHLOROETHYL)ETHER	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
BIS(2- ETHYLHEXYL)PHTHALATE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	57 J	44 J	NA	53 J	39 J	NA
BUTYL BENZYL PHTHALATE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
CARBAZOLE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
CHRYSENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	170 J	82 J	NA
DIBENZO(A,H)ANTHRACEN E	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
DIBENZOFURAN	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
DIETHYL PHTHALATE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
DIMETHYL PHTHALATE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA

#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 23 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	N1-0	N1-100	N1-150	N1-200
	MW02-	MW11-	MW11-	MW11-	MW11-	MW11-	MW12-		MW12-				
	1820	1113-D	2729	0103	2931	2931-D	SS12	SS16	SS05				
LOCATION ID	DSY-MW-	_	DSY-MW-	_	_	DSY-MW-	-	_		DSY-S-42-		DSY-S-42-	DSY-S-42-
	02	11	11	11	11	11	12	12	12	5	5	5	5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96		08/01/96	08/06/96		08/06/96	01/01/00		01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	_	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
DI-N-OCTYL PHTHALATE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
FLUORANTHENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	41 J	290 J	81 J	NA
FLUORENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
HEXACHLOROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
HEXACHLOROBUTADIENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
HEXACHLOROCYCLOPENT ADIENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
HEXACHLOROETHANE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
HIGH MOLECULAR WEIGHT PAHS	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	1376	457	NA
INDENO(1,2,3-CD)PYRENE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	66 J	NA	NA
ISOPHORONE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
LOW MOLECULAR WEIGHT PAHS	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	1	NA	NA	NA
NAPHTHALENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	1 J	NA	NA	NA
NITROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
N-NITROSO-DI-N- PROPYLAMINE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
N- NITROSODIPHENYLAMINE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
PENTACHLOROPHENOL	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 U	890 U	NA	NA	NA	NA
PHENANTHRENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	190 J	NA	NA
PHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
PYRENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	34 J	260 J	71 J	NA

#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 24 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	N1-0	N1-100	N1-150	N1-200
	MW02-	MW11-	MW11-	MW11-	MW11-	MW11-	MW12-	MW12-	MW12-				
	1820	1113-D	2729	0103	2931	2931-D	SS12	SS16	SS05				
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
	02	11	11	11	11	11	12	12	12	5	5	5	5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	76	1614	457	NA
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0 R	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
4,4'-DDE	0 R	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
4,4'-DDT	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ALDRIN	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
ALPHA-BHC	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
ALPHA-CHLORDANE	0 R	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
AROCLOR-1016	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
AROCLOR-1221	85 U	72 U	76 U	71 U	79 U	73 U	68 U	76 U	70 U	NA	NA	NA	NA
AROCLOR-1232	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
AROCLOR-1242	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
AROCLOR-1248	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
AROCLOR-1254	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
AROCLOR-1260	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
BETA-BHC	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
DELTA-BHC	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
DIELDRIN	0 R	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ENDOSULFAN I	0 R	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
ENDOSULFAN II	0 R	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ENDOSULFAN SULFATE	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ENDRIN	0 R	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ENDRIN ALDEHYDE	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ENDRIN KETONE	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA

#### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 25 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	N1-0	N1-100	N1-150	N1-200
	MW02-	MW11-	MW11-	MW11-	MW11-	MW11-	MW12-	MW12-	MW12-				
	1820	1113-D	2729	0103	2931	2931-D	SS12	SS16	SS05				
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
	02	11	11	11	11	11	12	12	12	5	5	5	5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96		08/01/96	08/06/96			01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT		29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
GAMMA-CHLORDANE	0 R	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
HEPTACHLOR	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	0 R	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
METHOXYCHLOR	22 U	18 U	19 U	18 U	20 U	18 U	17 U	20 U	18 U	NA	NA	NA	NA
PCB-209	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
SUM OF PCB CONGENERS X 2	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	58 P	NA	NA
TOXAPHENE	220 U	180 U	190 U	180 U	200 U	180 U	170 U	200 U	180 U	NA	NA	NA	NA
METALS (MG/KG)													
ALUMINUM	4890	5950 J	7540 J	6570 J	17900 J	15100 J	7770	17200	3840	NA	NA	NA	NA
ANTIMONY	11.8 UJ	10.5 U	11 U	11.2 U	11.2 U	11.7 U	9.8 UJ	9 UJ	11.5 UJ	NA	NA	NA	NA
ARSENIC	4.3	3.1	14.6	3.7	14.7	13.3	5.6	7.6	4.3	10	15	18	20
BARIUM	3.2	13.6	8.6	24.7	3.7	3.7	13	5.5	3.5 U	23	35	29	26
BERYLLIUM	0.23 U	0.27 J	0.24 J	0.32 J	0.27 J	0.26 J	0.28 J	0.23 J	0.22 U	NA	NA	NA	NA
CADMIUM	0.68 U	0.61 U	0.63 U	0.65 U	0.65 U	0.67 U	0.57 U	0.52 U	0.66 U	2.8	1.5	1.7	2
CALCIUM	3480	377	569	581	2520	2110	734	1770	688	NA	NA	NA	NA
CHROMIUM	10.9 J	9.8	18.3	10	24.6	23	14.2	23	6.5 J	22	12	14	15
COBALT	5.2	4.9	10.2	8.5	11.7	10.6	9.7	12.7	4.5	NA	NA	NA	NA
COPPER	8.6	16.6	19.3	15.5 J	23.6	28.7	17.2	25.1	7.9	NA	NA	NA	NA
IRON	13500	14900 J	32000 J	14200 J	44400 J	38200 J	18600	43100	12000	NA	NA	NA	NA
LEAD	6 J	6.2	3.6	7.4	11.8	9.6	4 J	5.7 J	1.7 UJ	14	20	14	11
MAGNESIUM	1950	1590	2570	2430	6850	5760	3260	6350	1470	NA	NA	NA	NA
MANGANESE	97.9	181	203	376	334	280	274 J	382 J	97.5 J	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 26 of 63

SAMPLE ID	MW02-	DSY-S- MW11-	MW11-	MW11-	MW11-	MW11-	MW12-	MW12-	MW12-	N1-0	N1-100	N1-150	N1-200
	1820	1113-D	2729	0103		2931-D	SS12		SS05				
LOCATION ID		_	_		_	_				DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
	02	11	11	11		11	12		12	5	5	5	5
SAMPLE DATE	08/08/96	08/01/96		07/31/96		08/01/96	08/06/96			01/01/00			01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT		29 FT	21 FT	_		8 FT	-	-	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT			23 FT	•		8 FT	~	8 FT	8 FT
0.1000	NORMAL	DUP	-									_	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	0.05 U	0.05 U	0.05 U	0.31	0.15	0.05 U	0.16 U	0.05 U	NA	NA	NA	NA
NICKEL	8.9	10.3 J	18.6 J	12.6 J	33.9	29.5	18.3 J	31.2 J	9.4 J	NA	NA	NA	NA
POTASSIUM	191	275	269	711	161	180	1190	151	199	NA	NA	NA	NA
SELENIUM	0.91 UJ	0.81 U	0.84 U	0.86 U	0.86 U	0.9 U	0.79 J	1.3 J	0.89 UJ	NA	NA	NA	NA
SILVER	1.4 UJ	1.2 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.1 UJ	1 UJ	1.3 UJ	5	NA	NA	3
SODIUM	66.3 U	46.8 U	50.4 U	55.1 U	42.9 U	47 U	72.6 U	104 U	30 U	NA	NA	NA	NA
THALLIUM	1.4 U	1.2 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.1 UJ	1 UJ	1.3 UJ	NA	NA	NA	NA
VANADIUM	11	8.5	14.9 J	9.7	23.9 J	18.8 J	13	17.4	6.4	NA	NA	NA	NA
ZINC	37	29	49.6	32.7	74.9	59.7	37.3	73.4 J	22	NA	NA	NA	NA
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	49 U	50 U	50 UJ	50 U	49 U	50 U	49 U	49 U	NA	NA	NA	NA
MONOBUTYLTIN	50 U	49 U	50 U		50 U	49 U	50 U	49 U	49 U	NA	NA NA	NA	NA
TETRABUTYLTIN	50 U	49 U	50 U		50 U	49 U	50 U		4.6 J	NA	NA NA	NA	NA NA
TRIBUTYLTIN	2.2 J	49 U	50 U		15.1 J	49 UJ	50 U		49 U	NA	NA NA	NA	NA
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	76 U	91 UJ	85 UJ	50 UJ	95 UJ	92 UJ	74 U	94 UJ	87 U	NA	NA	NA	NA
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	NA	NA	NA	NA
BARIUM	53.8	460 U	78.8 U	73.3 U	72.9 U	87 U	605	421	330	NA	NA	NA	NA
CADMIUM	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA	NA

### TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

### KTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE IS PAGE 27 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	N1-0	N1-100	N1-150	N1-200
	MW02-	MW11-	MW11-	MW11-	MW11-	MW11-	MW12-	MW12-	MW12-				
	1820	1113-D	2729	0103	2931	2931-D	SS12	SS16	SS05				
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
	02	11	11	11	11	11	12	12	12	5	5	5	5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	NA	NA	NA	NA
LEAD	24.7	1.8 U	1 U	1 U	1.5 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA
MERCURY	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	NA	NA	NA	NA
SELENIUM	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	NA	NA	NA	NA
SILVER	6 U	6 UJ	6 UJ	11 UJ	6 UJ	6 UJ	6 U	6 U	6 U	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 28 of 63

SAMPLE ID	DSY-S- MW02- 1820		N1-50		N1-B	N1-C	N1-D	N1-E	S1			S42 SWN	
LOCATION ID	DSY-MW- 02	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2- TETRACHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-BUTANONE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-HEXANONE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ACETONE	12 U	110 B	18 B	23 B	22 B	15 B	14 B	13 B	55 B	20 B	42 B	35 B	61 B
BENZENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHAN E	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BROMOFORM	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BROMOMETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	2 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROBENZENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLORODIBROMOMETHAN E	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROFORM	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROMETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 29 of 63

SAMPLE ID	DSY-S- MW02- 1820	N1-250		N1-A			N1-D		S1			S42 SWN	
LOCATION ID		DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
0.4451 5.5.455	02	5	5	5	5	5	5	5	5	5	5	5	5
SAMPLE DATE										01/01/00			01/01/00
TOP DEPTH	18 FT	_	8 FT	-	-	8 FT	-	_		8 FT	_	8 FT	8 FT
BOTTOM DEPTH										8 FT		-	8 FT
SACODE												NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DICHLOROPROPENE													
ETHYLBENZENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	12 U	NA	NA	1 JB	NA	NA	NA	1 JB	NA	NA	NA	1 JB	NA
STYRENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TETRACHLOROETHENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOLUENE	12 U	NA	0.9 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL 1,2-	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DICHLOROETHENE													
TOTAL XYLENES	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 J	NA
TRANS-1,3- DICHLOROPROPENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VINYL CHLORIDE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-OXYBIS(1- CHLOROPROPANE)	420 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 30 of 63

	MW02- 1820								S1			S42 SWN	
	DSY-MW- 02	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROTOLUENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-CHLOROPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-METHYLPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-NITROANILINE	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-NITROPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-NITROANILINE	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-DINITRO-2- METHYLPHENOL	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-BROMOPHENYL PHENYL ETHER	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLORO-3- METHYLPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLOROANILINE	420 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLOROPHENYL PHENYL ETHER	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-METHYLPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-NITROANILINE	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 31 of 63

SAMPLE ID	DSY-S- MW02- 1820	N1-250		N1-A		N1-C		N1-E	S1			S42 SWN	
LOCATION ID		DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
	02	5	5	5	5	5	5	5	5	5	5	5	5
SAMPLE DATE													01/01/00
TOP DEPTH	_	_	8 FT			8 FT		-	8 FT	8 FT			8 FT
BOTTOM DEPTH	20 FT	_						-		8 FT			8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	420 U	NA	46 J	NA	270 J	NA	NA	NA	NA	NA	NA	41 J	NA
ACENAPHTHYLENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	43 J	NA
ANTHRACENE	420 U	82 J	64 J	NA	490	NA	NA	NA	NA	NA	NA	120 J	NA
BENZO(A)ANTHRACENE	420 U	280 J	120 J	NA	1300	NA	NA	NA	NA	NA	NA	360	75 J
BENZO(A)PYRENE	420 UJ	230 J	98 J	NA	690	NA	NA	NA	NA	NA	NA	370	49 J
BENZO(B)FLUORANTHENE	420 UJ	300 J	140 J	NA	910	NA	NA	NA	NA	NA	NA	470	71 J
BENZO(G,H,I)PERYLENE	420 UJ	120 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	250 J	NA
BENZO(K)FLUORANTHENE	420 UJ	180 J	60 J	NA	350	NA	NA	NA	NA	NA	NA	150	NA
BIS(2- CHLOROETHOXY)METHAN E	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2- CHLOROETHYL)ETHER	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2- ETHYLHEXYL)PHTHALATE	420 U	64 J	NA	NA	NA	NA	NA	NA	44 J	NA	NA	NA	NA
BUTYL BENZYL PHTHALATE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CARBAZOLE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	420 U	350	140 J	NA	1300	NA	NA	NA	NA	NA	NA	460	90 J
DIBENZO(A,H)ANTHRACEN E	420 UJ	46 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIBENZOFURAN	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIETHYL PHTHALATE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIMETHYL PHTHALATE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 32 of 63

SAMPLE ID	DSY-S- MW02- 1820			N1-A					S1	S42 BOT		S42 SWN	
LOCATION ID	DSY-MW- 02	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DI-N-OCTYL PHTHALATE	420 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	420 U	580	300 J	44 J	4400	NA	NA	41 J	44 J	NA	NA	830	150 J
FLUORENE	420 U	NA	86 J	NA	730	NA	NA	NA	NA	NA	NA	44 J	NA
HEXACHLOROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENT ADIENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROETHANE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HIGH MOLECULAR WEIGHT PAHS	420 U	2656	1150	NA	11950	NA	NA	NA	NA	NA	NA	3850	545
INDENO(1,2,3-CD)PYRENE	420 UJ	140 J	62 J	NA	NA	NA	NA	NA	NA	NA	NA	240 J	NA
ISOPHORONE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LOW MOLECULAR WEIGHT PAHS	420 U	NA	486	NA	6690	NA	NA	NA	NA	NA	NA	718	NA
NAPHTHALENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NITROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-NITROSO-DI-N- PROPYLAMINE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N- NITROSODIPHENYLAMINE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	420 U	330	290 J	NA	5200	NA	NA	37 J	NA	NA	NA	470	130 J
PHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PYRENE	420 U	430	230 J	38 J	3000	NA	NA	36 J	39 J	NA	NA	720	110 J

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 33 of 63

SAMPLE ID	DSY-S- MW02- 1820			N1-A	N1-B	N1-C	N1-D		S1	S42 BOT		S42 SWN	
LOCATION ID	_	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
	02	5	5	5	5	5	5	5	5	5	5	5	5
						01/01/00					01/01/00		01/01/00
TOP DEPTH	_	-	8 FT		-	8 FT		-	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	-	8 FT	8 FT	-	8 FT	8 FT	-	8 FT	8 FT	8 FT	_	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	3068	1636	82	18640	NA	NA	114	83	NA	NA	4568	675
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ALDRIN	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ALPHA-BHC	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1016	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221	85 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BETA-BHC	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DELTA-BHC	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIELDRIN	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 34 of 63

SAMPLE ID	MW02- 1820			N1-A					S1			S42 SWN	
LOCATION ID		DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
	02	5	5	5	5	5	5	5	5	5	5	5	5
SAMPLE DATE													01/01/00
TOP DEPTH	_	_	8 FT	-	-	8 FT	-	_		8 FT	_	8 FT	8 FT
BOTTOM DEPTH										8 FT		-	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	22 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-209	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SUM OF PCB CONGENERS X 2	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100	NA
TOXAPHENE	220 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METALS (MG/KG)													
ALUMINUM	4890	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ANTIMONY	11.8 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	4.3	11	17	19	27	20	16	21	25	16	21	22	21
BARIUM	3.2	24	29	28	24	20	23	23	28	28	22	37	25
BERYLLIUM	0.23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	0.68 U	1.7	1.6	1.7	1.9	1.9	1.9	2.4	2.1	1.7	1.9	2	1.9
CALCIUM	3480	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	10.9 J	13	12	12	13	14	13	16	14	13	13	15	13
COBALT	5.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
COPPER	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
IRON	13500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	6 J	14	16	13	12	11	12	45	15	15	10	26	17
MAGNESIUM	1950	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	97.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 35 of 63

SAMPLE ID	MW02- 1820					N1-C			S1			S42 SWN	
LOCATION ID		DSY-S-42-	DSY-S-42-	DSY-S-42-		DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-	DSY-S-42-
	02	5	5	5	5	5	5	5	5	5	5	5	5
SAMPLE DATE	08/08/96					01/01/00				01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	_	-	~ : :	_	8 FT	~		8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	• • •	8 FT	~ : :	~	8 FT	~		8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NICKEL	8.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POTASSIUM	191	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SELENIUM	0.91 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	1.4 UJ	NA	NA	NA	3	3	3	4	3	NA	3	NA	NA
SODIUM	66.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
THALLIUM	1.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VANADIUM	11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ZINC	37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MONOBUTYLTIN	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TETRABUTYLTIN	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIBUTYLTIN	2.2 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	76 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PETROLEUM HYDROCARBONS	NA	NA	31	15	21	NA	NA	NA	NA	NA	NA	130	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	53.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

### TABLE

### ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 36 of 63

SAMPLE ID	DSY-S- MW02- 1820	N1-250	N1-50	N1-A	N1-B	N1-C	N1-D	N1-E	S1	S42 BOT	S42 SWE	S42 SWN	S42 SWS
LOCATION ID	DSY-MW- 02	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5	DSY-S-42- 5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	24.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MERCURY	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SELENIUM	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	6 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 37 of 63

SAMPLE ID	DSY-S-	S42 SWW	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-S-	DSY-S-
	MW02-		01-0911	03-0911	04-0406	06-0204	09-1416	10-1416	14-0103	14-0103-D	15-0103	TP01-	TP02-
	1820											1112	1516
LOCATION ID	DSY-MW-	DSY-S-42-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-TP-	DSY-TP-
	02	5	01	03	04	06	09	10	14	14	15	01	02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,1,2,2- TETRACHLOROETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,1,2-TRICHLOROETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,1-DICHLOROETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,1-DICHLOROETHENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,2-DICHLOROETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,2-DICHLOROPROPANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
2-BUTANONE	12 U	NA	11 U	11 U	12 U	12 U	12 U	17 U	11 U	11 U	11 U	11 U	NA
2-HEXANONE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
4-METHYL-2-PENTANONE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
ACETONE	12 U	41 B	16 U	14 U	19 U	27 U	50 U	65 U	15 U	14 U	16 U	15 U	NA
BENZENE	12 U	NA	11 U	11 U	12 U	1 J	12 U	12 U	11 U	11 U	11 U	11 U	NA
BROMODICHLOROMETHAN E	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
BROMOFORM	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
BROMOMETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CARBON DISULFIDE	2 J	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CARBON TETRACHLORIDE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CHLOROBENZENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CHLORODIBROMOMETHAN E	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CHLOROETHANE	12 U	NA	11 UJ	11 UJ	12 UJ	12 UJ	12 UJ	12 UJ	11 UJ	11 UJ	11 UJ	11 U	NA
CHLOROFORM	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CHLOROMETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA

 $W_{-}$ 

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 38 of 63

SAMPLE ID	DSY-S- MW02-	S42 SWW	DSY-SB- 01-0911	DSY-SB- 03-0911	DSY-SB- 04-0406	DSY-SB- 06-0204	DSY-SB- 09-1416	DSY-SB- 10-1416	DSY-SB- 14-0103	DSY-SB- 14-0103-D		DSY-S- TP01-	DSY-S- TP02-
	1820		01-0911	03-0911	04-0406	06-0204	09-1416	10-1416	14-0103	14-0103-D		1112	1516
LOCATION ID		DSY-S-42-		DSY-SB-		DSY-SB-				DSY-SB-		DSY-TP-	DSY-TP-
	02	5	01	03	04	06	09	10	14	14		01	02
SAMPLE DATE	08/08/96		09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT		11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
DICHLOROPROPENE													
ETHYLBENZENE	12 U		11 U						11 U	11 U	11 U	11 U	
METHYLENE CHLORIDE	12 U		22 U			20 U	_	23 U	11 U	11 U	11 U	13 U	
STYRENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
TETRACHLOROETHENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
TOLUENE	12 U	10 J	11 U	11 U	12 U	1 J	1 J	12 U	11 U	11 U	11 U	11 U	NA
TOTAL 1,2-	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
DICHLOROETHENE													
TOTAL XYLENES	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
TRANS-1,3- DICHLOROPROPENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
TRICHLOROETHENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
VINYL CHLORIDE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
1,2-DICHLOROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
1,3-DICHLOROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
1,4-DICHLOROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2,2'-OXYBIS(1- CHLOROPROPANE)	420 UJ	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2,4,5-TRICHLOROPHENOL	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
2,4,6-TRICHLOROPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2,4-DICHLOROPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2,4-DIMETHYLPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 39 of 63

SAMPLE ID	DSY-S-	S42 SWW	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-S-	DSY-S-
	MW02-		01-0911	03-0911	04-0406	06-0204	09-1416	10-1416	14-0103	14-0103-D	15-0103	TP01-	TP02-
	1820											1112	1516
LOCATION ID	DSY-MW-	DSY-S-42-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-TP-	DSY-TP-
	02	5	01	03	04	06	09	10	14	14	15	01	02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
2,4-DINITROTOLUENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2,6-DINITROTOLUENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2-CHLORONAPHTHALENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2-CHLOROPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2-METHYLNAPHTHALENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	50 J	400 U	66 J	360 UJ	NA
2-METHYLPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2-NITROANILINE	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
2-NITROPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
3,3'-DICHLOROBENZIDINE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
3-NITROANILINE	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
4,6-DINITRO-2- METHYLPHENOL	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
4-BROMOPHENYL PHENYL ETHER	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
4-CHLORO-3- METHYLPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
4-CHLOROANILINE	420 UJ	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
4-CHLOROPHENYL PHENYL ETHER	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
4-METHYLPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
4-NITROANILINE	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA

### **TABLE** ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 40 of 63

SAMPLE ID	DSY-S-	S42 SWW	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-S-	DSY-S-
	MW02-		01-0911	03-0911	04-0406	06-0204	09-1416	10-1416	14-0103	14-0103-D	15-0103	TP01-	TP02-
	1820											1112	1516
LOCATION ID	DSY-MW-	DSY-S-42-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-TP-	DSY-TP-
	02	5	01	03	04	06	09	10	14	14	15	01	02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96		08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
ACENAPHTHENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
ACENAPHTHYLENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
ANTHRACENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BENZO(A)ANTHRACENE	420 U	NA	530 U	510 U	490 U	440 U	84 J	480 UJ	67 J	400 U	400 U	360 UJ	NA
BENZO(A)PYRENE	420 UJ	NA	74 J	510 U	490 U	440 U	73 J	480 UJ	58 J	400 U	400 UJ	360 UJ	NA
BENZO(B)FLUORANTHENE	420 UJ	NA	81 J	510 U	490 U	440 U	130 J	480 UJ	100 J	400 U	400 UJ	43 J	NA
BENZO(G,H,I)PERYLENE	420 UJ	NA	61 J	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BENZO(K)FLUORANTHENE	420 UJ	NA	530 U	510 U	490 U	440 U	65 J	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BIS(2- CHLOROETHOXY)METHAN E	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BIS(2- CHLOROETHYL)ETHER	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BIS(2- ETHYLHEXYL)PHTHALATE	420 U	NA	530 U	510 U	800 U	440 U	430 U	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BUTYL BENZYL PHTHALATE	420 U	NA	530 U	510 U	490 U	440 U	48 J	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
CARBAZOLE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
CHRYSENE	420 U	NA	530 U	510 U	490 U	440 U	88 J	480 UJ	62 J	400 U	110 J	360 UJ	NA
DIBENZO(A,H)ANTHRACEN E	420 UJ	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
DIBENZOFURAN	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
DIETHYL PHTHALATE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
DIMETHYL PHTHALATE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 41 of 63

SAMPLE ID	DSY-S-	S42 SWW	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-S-	DSY-S-
	MW02-		01-0911	03-0911	04-0406	06-0204	09-1416	10-1416	14-0103	14-0103-D	15-0103	TP01-	TP02-
	1820											1112	1516
LOCATION ID	DSY-MW-	DSY-S-42-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-TP-	DSY-TP-
	02	5	01	03	04	06	09	10	14	14	15	01	02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	NA	530 U	510 U	50 J	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
DI-N-OCTYL PHTHALATE	420 UJ	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
FLUORANTHENE	420 U	NA	530 U	510 U	490 U	440 U	130 J	480 UJ	130 J	56 J	110 J	59 J	NA
FLUORENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
HEXACHLOROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
HEXACHLOROBUTADIENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
HEXACHLOROCYCLOPENT ADIENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
HEXACHLOROETHANE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
HIGH MOLECULAR WEIGHT PAHS	420 U	NA	216	510 U	490 U	440 U	740	480 U	567	99	320	169	NA
INDENO(1,2,3-CD)PYRENE	420 UJ	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
ISOPHORONE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
LOW MOLECULAR WEIGHT PAHS	420 U	NA	530 U	510 U	490 U	440 U	120	480 U	160	400 U	226	360 U	NA
NAPHTHALENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
NITROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
N-NITROSO-DI-N- PROPYLAMINE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
N- NITROSODIPHENYLAMINE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
PENTACHLOROPHENOL	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
PHENANTHRENE	420 U	NA	530 U	510 U	490 U	440 U	120 J	480 UJ	110 J	400 U	160 J	360 UJ	NA
PHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
PYRENE	420 U	NA	530 U	510 U	490 U	440 U	170 J	480 UJ	150 J	43 J	100 J	67 J	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 42 of 63

SAMPLE ID	DSY-S- MW02- 1820	S42 SWW			DSY-SB- 04-0406	DSY-SB- 06-0204	DSY-SB- 09-1416		DSY-SB- 14-0103	DSY-SB- 14-0103-D		DSY-S- TP01- 1112	DSY-S- TP02- 1516
LOCATION ID	DSY-MW-	DSY-S-42-		DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-		DSY-SB-	DSY-SB-		DSY-TP-	DSY-TP-
	02	-	01	03	04	06	09	10	14	14	15	01	02
SAMPLE DATE			09/03/96	09/03/96	09/04/96	09/04/96	09/05/96			09/06/96			08/22/96
TOP DEPTH	18 FT	-	9 FT	9 FT	4 FT	2 FT	14 FT		1 FT	1 FT		11 FT	15 FT
BOTTOM DEPTH	20 FT	-	11 FT		6 FT	4 FT	16 FT	_		3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL					NORMAL		_		DUP			NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	NA	216	510 U	490 U	440 U	860	480 U	727	99	546	169	NA
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0 R	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
4,4'-DDE	0 R	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
4,4'-DDT	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ALDRIN	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
ALPHA-BHC	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
ALPHA-CHLORDANE	0 R	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
AROCLOR-1016	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
AROCLOR-1221	85 U	NA	110 U	100 U	98 U	88 U	86 U	96 U	90 U	81 U	81 U	72 U	NA
AROCLOR-1232	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
AROCLOR-1242	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
AROCLOR-1248	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
AROCLOR-1254	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
AROCLOR-1260	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
BETA-BHC	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
DELTA-BHC	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
DIELDRIN	0 R	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ENDOSULFAN I	0 R	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
ENDOSULFAN II	0 R	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ENDOSULFAN SULFATE	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ENDRIN	0 R	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ENDRIN ALDEHYDE	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ENDRIN KETONE	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 43 of 63

SAMPLE ID	DSY-S-	S42 SWW				DSY-SB-			DSY-SB-	DSY-SB-			DSY-S-
	MW02- 1820		01-0911	03-0911	04-0406	06-0204	09-1416	10-1416	14-0103	14-0103-D	15-0103	TP01- 1112	TP02- 1516
LOCATION ID	DSY-MW-	DSY-S-42-	DSY-SB-	DSY-SB-		DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-TP-	DSY-TP-
	02	5	01	03	• .	06	09	10	14	14	15	01	02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96		09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
GAMMA-CHLORDANE	0 R	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
HEPTACHLOR	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
HEPTACHLOR EPOXIDE	0 R	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
METHOXYCHLOR	22 U	NA	27 U	26 U	25 U	23 U	22 U	25 U	23 U	21 U	21 U	19 U	NA
PCB-209	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
SUM OF PCB CONGENERS X 2	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	220 U	NA	270 U	260 U	250 U	230 U	220 U	250 U	230 U	210 U	210 U	190 U	NA
METALS (MG/KG)													
ALUMINUM	4890	NA	11100	10400	3270	3990	9530	13000	10500	10400	10700	5860	7450
ANTIMONY	11.8 UJ	NA	10.3 UJ	11.8 UJ	11 UJ	12 UJ	11.4 UJ	12.6 UJ	10.5 UJ	10.9 UJ	11.6 UJ	10.9 UJ	9.4 UJ
ARSENIC	4.3	15	24	17	3.5 U	7.7	15.7	17.8	17.7	17.9	16.1	7.7 J	7.8 J
BARIUM	3.2	34	8.3	6.3	4	6.6	19.4	20.2	20.7	21.1	10.1	2.9 UJ	18 J
BERYLLIUM	0.23 U	NA	0.25 J	0.23 U	0.21 U	0.23 U	0.45 J	0.52	0.44	0.46	0.32 J	0.21 UJ	0.34 J
CADMIUM	0.68 U	1.7	1 J	0.72 J	0.63 UJ	0.69 UJ	0.66 UJ	1.1 J	0.61 UJ	1 J	0.97 J	0.63 UJ	0.54 UJ
CALCIUM	3480	NA	750 J	874 J	658 J	585 J	3630 J	929 J	1000 J	1250 J	1170 J	1140	3490
CHROMIUM	10.9 J	12	15.9	13.6	8.1	60.2	13.1	18.4	14.3	13.2	14.5	6.6 J	10.9 J
COBALT	5.2	NA	14.7	11.8	3.9 U	6.3	12	12.1	10.8	9.6	12.8	4.4 J	9.1 J
COPPER	8.6	NA	16.2	16.1	4.1	38.8	18.5	12.4	20.7	14.3	19.9	7 J	21.2 J
IRON	13500	NA	36000	32300	9520	29200	25700	31100	24200	24400	28400	16800	19700
LEAD	6 J	16	12.5 J	15.5 J	1.5 J	1.3 UJ	16.1 J	8.2 J	12.5 J	29.5 J	5.3 J	7.6 J	34.2 J
MAGNESIUM	1950	NA	4000	3760	1270	1500	2610	3470	2750	2730	3450	2230	2380
MANGANESE	97.9	NA	551 J	451 J	93.2 J	236 J	366 J	311 J	352 J	302 J	289 J	104 J	353 J

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 44 of 63

SAMPLE ID	DSY-S- MW02- 1820	S42 SWW				DSY-SB- 06-0204	DSY-SB- 09-1416		DSY-SB- 14-0103	DSY-SB- 14-0103-D		DSY-S- TP01- 1112	DSY-S- TP02- 1516
LOCATION ID		DSY-S-42-	DCV CD	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-TP-	DSY-TP-
LOCATION ID	02	5	01	03	04	06	09	10	14	14	15	01	02
SAMPLE DATE	08/08/96	~	09/03/96	09/03/96	-	09/04/96	09/05/96		09/06/96	09/06/96		08/22/96	08/22/96
TOP DEPTH	18 FT		9 FT			2 FT	14 FT		1 FT	1 FT		11 FT	15 FT
BOTTOM DEPTH	20 FT		11 FT			4 FT	16 FT		3 FT	3 FT	3 FT	12 FT	16 FT
SACODE		NORMAL	NORMAL	NORMAL			NORMAL		ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM		NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	NA	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.04 U	0.05 U	0.05 U	0.06 U
NICKEL	8.9	NA	21.2	21.2	7.2 U	30.1	18	24.7	16.6	16.9	21.9	10.7 J	18.9 J
POTASSIUM	191	NA	346	221	221	190	424	402	513	658	287	121	337
SELENIUM	0.91 UJ	NA	0.8 UJ	0.91 UJ	0.84 UJ	0.92 UJ	0.88 UJ	0.97 UJ	0.81 UJ	0.84 UJ	0.89 UJ	0 R	0 R
SILVER	1.4 UJ	3	1.2 UJ	1.4 UJ	1.3 UJ	1.4 UJ	1.3 UJ	1.4 UJ	1.2 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.1 UJ
SODIUM	66.3 U	NA	74.8 U	143 U	28.9 U	27.7 U	74.1 U	60.7 U	56.6 U	58.3 U	36.7 U	36.7 U	103 UJ
THALLIUM	1.4 U	NA	1.2 UJ	1.4 UJ	1.3 UJ	1.4 UJ	1.3 UJ	1.4 UJ	1.2 UJ	1.3 UJ	1.3 UJ	0 R	0 R
VANADIUM	11	NA	19.4 J	17.6 J	7	10.7 J	17.5 J	22.8 J	15.8 J	15.8 J	14 J	9	13.9
ZINC	37	NA	64	82.5	18	49.9	50.9	50.1	54.7	48.2	43.6	52.5 J	74.8 J
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	NA	49 U	49 U	49 U	50 U	49 U	50 U	50 U	50 U	49 U	50 U	NA
MONOBUTYLTIN	50 U	NA	49 U	49 U	49 U	50 U	49 U	50 U	50 U	50 U	49 U	50 U	NA
TETRABUTYLTIN	50 U	NA	49 U	49 U	49 U	50 U	49 U	50 U	50 U	50 U	49 U	50 U	NA
TRIBUTYLTIN	2.2 J	NA	49 U	49 U	49 U	50 U	49 U	50 U	50 U	50 U	49 U	50 U	NA
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	76 U	NA	110 U	100 U	93 U	86 U	17000	87 U	91 U	82 U	74 U	72	NA
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	NA	4 U	4 U	4 U	4 U	13.5	24.6	4 U	4.3 J	6.2 J	4 U	NA
BARIUM	53.8	NA	75 U	103 U	78.5 U	123 U	186 U	158 U	113 U	115 U	149 U	508 U	NA
CADMIUM	3 U	NA	3 U	3 U	3 U	21.5 UJ	3 U	6.6 UJ	3.5 UJ	7.8 UJ	8.5 UJ	3 U	NA

### TABLE

### ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 45 of 63

SAMPLE ID	DSY-S-	S42 SWW	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-S-	DSY-S-
	MW02-		01-0911	03-0911	04-0406	06-0204	09-1416	10-1416	14-0103	14-0103-D	15-0103	TP01-	TP02-
	1820											1112	1516
LOCATION ID	DSY-MW-	DSY-S-42-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-SB-	DSY-TP-	DSY-TP-
	02	5	01	03	04	06	09	10	14	14	15	01	02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	NA	6 U	18.2 UJ	7.4 UJ	129	13.4 UJ	29.5 J	6 U	7.6 UJ	6 U	6 U	NA
LEAD	24.7	NA	9.6 U	14.1 U	1.3 UJ	1 U	7.8 U	4.2 U	3.1 U	5.3 U	6.1 U	2.9 U	NA
MERCURY	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA
SELENIUM	4 U	NA	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4.3 UJ	NA
SILVER	6 U	NA	13.7 UJ	7.5 UJ	9 UJ	10.6 UJ	11.8 UJ	20.4 UJ	10.2 UJ	7.2 UJ	11.9 UJ	15.4 UJ	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 46 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
07 till 22 15	MW02-	TP05-	TP06-	TP08-	TP08-	TP09-	TP09-		TP10-	TP11-	TP11-	TP13-	TP13-
	1820	1213	1213	0910	0406	0910	0406		0507	1213	0507	1011	0506
LOCATION ID	DSY-MW-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	05	06	08	08	09	09	10	10	11	11	13	13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,1,2,2- TETRACHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,1,2-TRICHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,1-DICHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,1-DICHLOROETHENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,2-DICHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,2-DICHLOROPROPANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
2-BUTANONE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	22 U
2-HEXANONE	12 U	NA	NA	12 UJ	10 UJ	NA	NA	NA	NA	12 U	NA	NA	12 UJ
4-METHYL-2-PENTANONE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 UJ
ACETONE	12 U	NA	NA	15 U	10 U	NA	NA	NA	NA	23 U	NA	NA	110 U
BENZENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
BROMODICHLOROMETHAN E	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
BROMOFORM	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
BROMOMETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CARBON DISULFIDE	2 J	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CARBON TETRACHLORIDE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CHLOROBENZENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CHLORODIBROMOMETHAN E	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CHLOROFORM	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CHLOROMETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 47 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	TP05-	TP06-	TP08-	TP08-	TP09-	TP09-	TP10-	TP10-	TP11-	TP11-	TP13-	TP13-
	1820	1213	1213	0910	0406	0910	0406	1213	0507	1213	0507	1011	0506
LOCATION ID	DSY-MW-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	05	06	08	08	09	09	10	10	11	11	13	13
SAMPLE DATE	08/08/96				07/29/96	07/29/96				07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT		5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
DICHLOROPROPENE													
ETHYLBENZENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
METHYLENE CHLORIDE	12 U	NA	NA	12 U		NA	NA	NA	NA	12 U	NA	NA	12 U
STYRENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
TETRACHLOROETHENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
TOLUENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
TOTAL 1,2-	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
DICHLOROETHENE													
TOTAL XYLENES	12 U	NA	NA	12 U	10 U		NA		NA	12 U	NA		_
TRANS-1,3- DICHLOROPROPENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
TRICHLOROETHENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
VINYL CHLORIDE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
1,2-DICHLOROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
1,3-DICHLOROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
1,4-DICHLOROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2,2'-OXYBIS(1- CHLOROPROPANE)	420 UJ	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2,4,5-TRICHLOROPHENOL	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U
2,4,6-TRICHLOROPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
2,4-DICHLOROPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2,4-DIMETHYLPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 48 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	TP05-	TP06-	TP08-	TP08-	TP09-	TP09-	-	TP10-	TP11-	TP11-	TP13-	TP13-
	1820	1213	1213	0910	0406	0910	0406	1213	0507	1213	0507	1011	0506
LOCATION ID	DSY-MW-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	05	06	08	08	09	09	10	10	11	11	13	13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	NA	NA	9100 U	870 UJ	NA	NA	NA	NA	970 UJ	NA	NA	990 UJ
2,4-DINITROTOLUENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
2,6-DINITROTOLUENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
2-CHLORONAPHTHALENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
2-CHLOROPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2-METHYLNAPHTHALENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2-METHYLPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2-NITROANILINE	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U
2-NITROPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
3,3'-DICHLOROBENZIDINE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
3-NITROANILINE	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U
4,6-DINITRO-2- METHYLPHENOL	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U
4-BROMOPHENYL PHENYL ETHER	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
4-CHLORO-3- METHYLPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
4-CHLOROANILINE	420 UJ	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
4-CHLOROPHENYL PHENYL ETHER	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
4-METHYLPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
4-NITROANILINE	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U

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# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 49 of 63

SAMPLE ID	DSY-S- MW02-	TP05-	TP06-	TP08-	TP08-	DSY-S- TP09-	TP09-	TP10-	DSY-S- TP10-	DSY-S- TP11-	TP11-	DSY-S- TP13-	DSY-S- TP13-
	1820	1213	1213	0910	0406	0910	0406	_	0507	1213	0507	1011	0506
LOCATION ID	DSY-MW-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	05	06	08	08	09	09	10	10	11	11	13	13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 UJ
ACENAPHTHENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
ACENAPHTHYLENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
ANTHRACENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
BENZO(A)ANTHRACENE	420 U	NA	NA	3600 U	48 J	NA	NA	NA	NA	390 UJ	NA	NA	390 U
BENZO(A)PYRENE	420 UJ	NA	NA	3600 U	55 J	NA	NA	NA	NA	390 U	NA	NA	390 U
BENZO(B)FLUORANTHENE	420 UJ	NA	NA	3600 U	80 J	NA	NA	NA	NA	390 U	NA	NA	390 U
BENZO(G,H,I)PERYLENE	420 UJ	NA	NA	3600 U	45 J	NA	NA	NA	NA	390 U	NA	NA	390 U
BENZO(K)FLUORANTHENE	420 UJ	NA	NA	3600 U	68 J	NA	NA	NA	NA	390 U	NA	NA	390 U
BIS(2- CHLOROETHOXY)METHAN E	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
BIS(2- CHLOROETHYL)ETHER	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
BIS(2- ETHYLHEXYL)PHTHALATE	420 U	NA	NA	22000	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
BUTYL BENZYL PHTHALATE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
CARBAZOLE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
CHRYSENE	420 U	NA	NA	3600 U	54 J	NA	NA	NA	NA	390 UJ	NA	NA	390 U
DIBENZO(A,H)ANTHRACEN E	420 UJ	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 U	NA	NA	390 U
DIBENZOFURAN	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
DIETHYL PHTHALATE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
DIMETHYL PHTHALATE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 50 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	TP05-	TP06-	TP08-	TP08-	TP09-	TP09-	TP10-	TP10-	TP11-	TP11-	TP13-	TP13-
	1820	1213	1213	0910	0406	0910	0406	1213	0507	1213	0507	1011	0506
LOCATION ID	DSY-MW-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	05	06	08	08	09	09	10	10	11	11	13	13
SAMPLE DATE	08/08/96		07/29/96	07/29/96		07/29/96			07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
DI-N-OCTYL PHTHALATE	420 UJ	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 U	NA	NA	390 U
FLUORANTHENE	420 U	NA	NA	3600 U	120 J	NA	NA	NA	NA	390 UJ	NA	NA	390 U
FLUORENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
HEXACHLOROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
HEXACHLOROBUTADIENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
HEXACHLOROCYCLOPENT ADIENE	420 U	NA	NA	3600 U	350 UJ	NA	NA	NA	NA	390 UJ	NA	NA	390 U
HEXACHLOROETHANE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
HIGH MOLECULAR WEIGHT PAHS	420 U	NA	NA	3600 U	598	NA	NA	NA	NA	390 U	NA	NA	390 U
INDENO(1,2,3-CD)PYRENE	420 UJ	NA	NA	3600 U	41 J	NA	NA	NA	NA	390 U	NA	NA	390 U
ISOPHORONE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
LOW MOLECULAR WEIGHT PAHS	420 U	NA	NA	3600 U	57	NA	NA	NA	NA	390 U	NA	NA	390 U
NAPHTHALENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
NITROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
N-NITROSO-DI-N- PROPYLAMINE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
N- NITROSODIPHENYLAMINE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
PENTACHLOROPHENOL	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U
PHENANTHRENE	420 U	NA	NA	3600 U	57 J	NA	NA	NA	NA	390 UJ	NA	NA	390 U
PHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
PYRENE	420 U	NA	NA	3600 U	87 J	NA	NA	NA	NA	390 UJ	NA	NA	390 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 51 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	TP05-	TP06-	TP08-	TP08-	TP09-	TP09-	TP10-	TP10-	TP11-	TP11-	TP13-	TP13-
	1820	1213	1213	0910		0910	0406		0507	1213	0507	1011	0506
LOCATION ID	DSY-MW-		DSY-TP-	DSY-TP-	_	DSY-TP-	DSY-TP-		DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	05	06	08	08	09	09	10	10	11	11	13	13
SAMPLE DATE										07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT		12 FT	9 FT		9 FT	4 FT		5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	_	13 FT	_	6 FT	10 FT	6 FT	_	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL					NORMAL			NORMAL	NORMAL		NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	NA	NA	3600 U	655	NA	NA	NA	NA	390 U	NA	NA	390 U
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0 R	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
4,4'-DDE	0 R	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
4,4'-DDT	4.3 U	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
ALDRIN	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
ALPHA-BHC	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
ALPHA-CHLORDANE	0 R	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
AROCLOR-1016	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1221	85 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1232	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1242	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1248	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1254	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1260	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
BETA-BHC	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
DELTA-BHC	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
DIELDRIN	0 R	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
ENDOSULFAN I	0 R	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
ENDOSULFAN II	0 R	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
ENDOSULFAN SULFATE	4.3 U	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
ENDRIN	0 R	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	5.5	NA	NA	3.9 U
ENDRIN ALDEHYDE	4.3 U	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
ENDRIN KETONE	4.3 U	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 52 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	TP05-	TP06-	TP08-	TP08-	TP09-	TP09-	TP10-	TP10-	TP11-	TP11-	TP13-	TP13-
	1820	1213	1213	0910	0406	0910	0406	1213	0507	1213	0507	1011	0506
LOCATION ID	DSY-MW-		DSY-TP-	DSY-TP-		DSY-TP-	DSY-TP-			DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	05	06	08		09	09	10	10	11	11	13	13
SAMPLE DATE										07/26/96			07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT		9 FT	4 FT		5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT			10 FT	6 FT		7 FT	13 FT		11 FT	6 FT
SACODE	NORMAL									NORMAL		NORMAL	ORIG
QC TYPE	NM		NM	NM	NM	NM			NM	NM		NM	NM
GAMMA-BHC (LINDANE)	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
GAMMA-CHLORDANE	0 R	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
HEPTACHLOR	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
HEPTACHLOR EPOXIDE	0 R	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
METHOXYCHLOR	22 U	NA	NA	19 UJ	18 U	NA	NA	NA	NA	20 U	NA	NA	20 U
PCB-209	4.3 U	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
SUM OF PCB CONGENERS X 2	4.3 U	NA	NA	3.6 U	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	220 U	NA	NA	190 UJ	180 U	NA	NA	NA	NA	200 U	NA	NA	200 U
METALS (MG/KG)													
ALUMINUM	4890	12100	13400	4900	7660	23300	17100	10000	3610	12600	9950	9310	11000
ANTIMONY	11.8 UJ	9 UJ	8.7 UJ	8.9 UJ	9.1 UJ	9.1 UJ	9.8 UJ	11 UJ	8.9 UJ	9.6 UJ	11.5 UJ	14 UJ	8.9 UJ
ARSENIC	4.3	23.2	21.6	3.2	8.7	15.9	11.7	17.3	3	36.9	22	15.7	16.1
BARIUM	3.2	13.9	14.3 J	7.2	18.4	16	13.2	17.3	5.4	17.5	15.9	14.5	23.4
BERYLLIUM	0.23 U	0.38 J	0.39 J	0.2 J	0.67	0.46	0.37 J	0.27 J	0.17 U	0.48	0.53	0.54	0.4 J
CADMIUM	0.68 U	0.52 U	0.56 J	0.51 U	0.53 U	0.52 U	0.57 U	0.66 J	0.52 U	1.2 J	1.1 UJ	0.97 UJ	0.7 J
CALCIUM	3480	1230	812	634	917	758	907	322	504	421	363	1880	478
CHROMIUM	10.9 J	15	16.5	9.3	18.2	32.5	22.5	13	6.2 J	17.8	8.9	9.6	13.3
COBALT	5.2	29.9	16.3	4.1	9.9	25	14	11.3	3.1	20.2 J	11.4	9	10 J
COPPER	8.6	18.9	23.6	9.5	46.1	39	22.1	18	6	27.4	18.1	15.8	11
IRON	13500	30800	34100	13000	22300	50000	36200	25100	10600	40100	25800	26000	25400
LEAD	6 J	10.6 J	15.8 J	7.1 J	67.2 J	34.6 J	12.9 J	7.7 J	4.1 J	11.3	8.5 J	24.1	11.8
MAGNESIUM	1950	3790	3820	1970	2560	8600	5900	2670	1330	3730	2420	2660	2460
MANGANESE	97.9	800	512	150	305	2450	398	344	78.6	612 J	323	373	529 J

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 53 of 63

NM/02	SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
1820   1213   1213   0910   0406   0910   0406   1213   0507   1213   0507   1011   050	SAMPLE ID													TP13-
DSY-TP-   DSY-		-							-	-			_	0506
Decoration   Color	I OCATION ID		_	_					_					DSY-TP-
TOP DEPTH 18 FT 12 FT 12 FT 12 FT 9 FT 4 FT 9 FT 4 FT 12 FT 5 FT 12 FT 5 FT 10 FT 5 F  BOTTOM DEPTH 20 FT 13 FT 13 FT 10 FT 6 FT 10 FT 6 FT 13 FT 7 FT 13 FT 7 FT 11 FT 6 F  SACODE NORMAL NORM				_	_	_	_			_	_	_	_	_
BOTTOM DEPTH   20 FT   13 FT   13 FT   10 FT   6 FT   10 FT   6 FT   13 FT   7 FT   13 FT   7 FT   11 FT   6 FSACODE   NORMAL	SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
SACODE	TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
CC TYPE	BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
MERCURY    0.06 U   0.05 U   0.06 U   0.05 U   0.05 U   0.05 U   0.05 U   0.05 U   0.05 U   0.05 U   0.05 U   0.08 U   0.07	SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
NICKEL 8.9 30.9 24.1 J 10.2 J 31.6 48.1 27.7 19.7 J 8.9 J 33.1 20.1 14.4 POTASSIUM 191 365 224 306 417 225 250 373 216 340 259 219 SELENIUM 0.91 UJ 0.7 U 0.67 U 0.68 U 0.7 U 0.7 U 1.4 J 0.85 U 0.69 U 0.83 J 0.89 U 1.1 U SILVER 1.4 UJ 1 UJ 1 UJ 1 UJ 1.1 UJ 1.6 J 1.1 UJ 1.3 U 1.0 J 1.1 U 1.3 U 1.6 U THALLIUM 66.3 U 23 J 9 J 353 47.9 J 16.3 J 14.5 J 34.5 J 17.6 J 42.5 U 52.7 UJ 69.9 UJ THALLIUM 1.4 U 1 U 1 U 1 U 1.1 U 1.1 U 1.1 U 1.3 U 1.3 U 1.3 U 1.3 U 1.3 U 1.4 UJ 1.3 U 1.6 U VANADIUM 11 17 J 18.3 J 8.4 J 13.5 J 19.5 J 19.6 J 15.9 J 7.5 J 18.5 J 16.8 J 16.2 ZINC 37 59.3 57 31.4 158 84.6 58.3 44 21.2 65.1 41.9 47.9  MISCELLANEOUS PARAMETERS (UG/KG) DIBUTYLTIN 50 U NA NA 50 U 50 U NA NA NA NA NA 49 U NA NA MONOBUTYLTIN 50 U NA NA 50 U 50 U NA NA NA NA NA 49 U NA NA TETRABUTYLTIN 50 U NA NA 50 U 50 U NA NA NA NA NA 49 U NA NA TRIBUTYLTIN 2.2 J NA NA 50 U 50 U NA NA NA NA NA 49 U NA NA TRIBUTYLTIN 2.2 J NA NA 50 U 50 U NA NA NA NA NA 49 U NA NA TRIBUTYLTIN 2.2 J NA NA 50 U 50 U NA NA NA NA NA NA 49 U NA NA TRIBUTYLTIN 2.2 J NA NA 50 U 50 U NA NA NA NA NA NA 49 U NA NA TRIBUTYLTIN 2.2 J NA NA 50 U 50 U NA NA NA NA NA NA 49 U NA NA TRIBUTYLTIN 2.2 J NA NA SO U 50 U NA NA NA NA NA NA NA NA NA NA NA NA NA	QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
POTASSIUM  191 365 224 306 417 225 250 373 216 340 259 219  SELENIUM  0.91 UJ 0.7 U 0.67 U 0.68 U 0.7 U 0.7 U 1.4 J 0.85 U 0.69 U 0.83 J 0.89 U 1.1 UJ SILVER  1.4 UJ 1 UJ 1 UJ 1 UJ 1 UJ 1 1.1 UJ 1.6 J 1.1 UJ 1.3 UJ 1 UJ 1.1 UJ 1.1 UJ 1.3 UJ 1 UJ 1.1 UJ 1.3 UJ 1 UJ 1.1 UJ 1.1 UJ 1.3 UJ 1 UJ 1.4 UJ 1 UJ 1.5 UJ 1.5 UJ 1.6 UJ 2.0 U	MERCURY	0.06 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.08 U	0.05 U	0.07	0.11 U
SELENIUM	NICKEL	8.9	30.9	24.1 J	10.2 J	31.6	48.1	27.7	19.7 J	8.9 J	33.1	20.1	14.4	15
SILVER 1.4 UJ 1 UJ 1 UJ 1.1 UJ 1.6 J 1.1 UJ 1.3 UJ 1 UJ 1.1 U 1.3 U 1.6 U SODIUM 66.3 U 23 J 9 J 353 47.9 J 16.3 J 14.5 J 34.5 J 17.6 J 42.5 U 52.7 UJ 69.9 UJ THALLIUM 1.4 U 1 U 1 U 1.1 U 1.1 U 1.1 U 1.3 U 1.0 U 1.1 UJ 1.3 U 1.6 U VANADIUM 11 17 J 18.3 J 8.4 J 13.5 J 19.5 J 19.6 J 15.9 J 7.5 J 18.5 J 16.8 J 16.2 ZINC 37 59.3 57 31.4 158 84.6 58.3 44 21.2 65.1 41.9 47.9 MISCELLANEOUS PARAMETERS (UG/KG) DIBUTYLTIN 50 U NA NA 50 U 50 U NA NA NA NA NA 49 U NA NA NA NA NA NA NA NA NA NA NA NA NA	POTASSIUM	191	365	224	306	417	225	250	373	216	340	259	219	205
SODIUM 66.3 U 23 J 9 J 353 47.9 J 16.3 J 14.5 J 34.5 J 17.6 J 42.5 U 52.7 UJ 69.9 UJ THALLIUM 1.4 U 1 U 1 U 1 U 1.1 U 1.1 U 1.3 U 1.1 U 1.1 UJ 1.3 U 1.6 U VANADIUM 11 17 J 18.3 J 8.4 J 13.5 J 19.5 J 19.6 J 15.9 J 7.5 J 18.5 J 16.8 J 16.2 ZINC 37 59.3 57 31.4 158 84.6 58.3 44 21.2 65.1 41.9 47.9  MISCELLANEOUS PARAMETERS (UG/KG) DIBUTYLTIN 50 U NA NA 50 U 50 U NA NA NA NA NA 49 U NA NA TETRABUTYLTIN 50 U NA NA 2.9 J 50 U NA NA NA NA 49 U NA NA TRIBUTYLTIN 2.2 J NA NA 50 U 50 U NA NA NA NA 49 U NA NA TRIBUTYLTIN 2.2 J NA NA 50 U 50 U NA NA NA NA 49 U NA NA TRIBUTYLTIN 2.2 J NA NA 50 U 50 U NA NA NA NA 49 U NA NA TOTAL PETROLEUM HYDROCARBONS (MG/KG)  TCLP METALS (UG/L)	SELENIUM	0.91 UJ	0.7 U	0.67 U	0.68 U	0.7 U	0.7 U	1.4 J	0.85 U	0.69 U	0.83 J	0.89 U	1.1 U	1.4
THALLIUM 1.4 U 1 U 1 U 1 U 1.1 U 1.1 U 1.3 U 1 U 1.1 U 1.3 U 1 U 1.1 U 1.3 U 1 U 1.6 U VANADIUM 11 17 J 18.3 J 8.4 J 13.5 J 19.5 J 19.6 J 15.9 J 7.5 J 18.5 J 16.8 J 16.2 ZINC 37 59.3 57 31.4 158 84.6 58.3 44 21.2 65.1 41.9 47.9 MISCELLANEOUS PARAMETERS (UG/KG)  DIBUTYLTIN 50 U NA NA 50 U 50 U NA NA NA NA NA NA 49 U NA NA NA NA NA NA NA NA NA NA NA NA NA	SILVER	1.4 UJ	1 UJ	1 UJ	1 UJ	1.1 UJ	1.6 J	1.1 UJ	1.3 UJ	1 UJ	1.1 U	1.3 U	1.6 U	1 U
VANADIUM  11 17 J 18.3 J 8.4 J 13.5 J 19.5 J 19.6 J 15.9 J 7.5 J 18.5 J 16.8 J 16.2  ZINC  37 59.3 57 31.4 158 84.6 58.3 44 21.2 65.1 41.9 47.9  MISCELLANEOUS PARAMETERS (UG/KG)  DIBUTYLTIN  50 U NA NA SO U 50 U NA NA NA NA NA NA 49 U NA NA NA NA NA TETRABUTYLTIN  50 U NA NA 2.9 J 50 U NA NA NA NA NA 49 U NA NA NA TRIBUTYLTIN  50 U NA NA 50 U 50 U NA NA NA NA NA 49 U NA NA NA NA PRETROLEUM HYDROCARBONS (MG/KG)  CREOSOTE  76 U NA NA SO U 53 U NA NA NA NA NA NA SO U NA NA NA NA NA NA NA NA NA NA NA NA NA	SODIUM	66.3 U	23 J	9 J	353	47.9 J	16.3 J	14.5 J	34.5 J	17.6 J	42.5 U	52.7 UJ	69.9 UJ	82.8
ZINC 37 59.3 57 31.4 158 84.6 58.3 44 21.2 65.1 41.9 47.9  MISCELLANEOUS PARAMETERS (UG/KG)  DIBUTYLTIN 50 U NA NA 50 U 50 U NA NA NA NA 49 U NA NA MONOBUTYLTIN 50 U NA NA 50 U 50 U NA NA NA NA 49 U NA NA TETRABUTYLTIN 50 U NA NA 2.9 J 50 U NA NA NA NA 49 U NA NA TRIBUTYLTIN 2.2 J NA NA 50 U 50 U NA NA NA NA 49 U NA NA TRIBUTYLTIN 2.2 J NA NA 50 U 50 U NA NA NA NA NA 49 U NA NA TRIBUTYLTIN 50 U NA NA 50 U 50 U NA NA NA NA NA NA 49 U NA NA TOTAL PETROLEUM HYDROCARBONS (MG/KG)  CREOSOTE 76 U NA NA S3 U 53 U NA NA NA NA NA NA NA NA NA NA NA NA TOTAL PETROLEUM HYDROCARBONS TCLP METALS (UG/L)	THALLIUM	1.4 U	1 U	1 U	1 U	1.1 U	1 U	1.1 U	1.3 U	1 U	1.1 UJ	1.3 U	1.6 U	1 UJ
MISCELLANEOUS   PARAMETERS (UG/KG)   DIBUTYLTIN   50 U NA NA 50 U 50 U NA NA NA NA NA 49 U NA NA NA MONOBUTYLTIN   50 U NA NA NA NA NA NA NA NA NA NA NA NA NA	VANADIUM	11	17 J	18.3 J	8.4 J	13.5 J	19.5 J	19.6 J	15.9 J	7.5 J	18.5 J	16.8 J	16.2	17.8 J
DIBUTYLTIN	ZINC	37	59.3	57	31.4	158	84.6	58.3	44	21.2	65.1	41.9	47.9	38.9
MONOBUTYLTIN         50 U         NA         NA         50 U         50 U         NA         NA         NA         NA         49 U         NA         NA           TETRABUTYLTIN         50 U         NA         NA         2.9 J         50 U         NA         NA         NA         NA         49 U         NA         NA           TRIBUTYLTIN         2.2 J         NA         NA         50 U         50 U         NA														
TETRABUTYLTIN 50 U NA NA 2.9 J 50 U NA NA NA 49 U NA NA NA NA NA NA NA NA NA NA NA NA NA	DIBUTYLTIN	50 U	NA	NA	50 U	50 U	NA	NA	NA	NA	49 U	NA	NA	50 U
TRIBUTYLTIN         2.2 J         NA         NA         50 U         50 U         NA         NA         NA         49 U         NA         NA           PETROLEUM HYDROCARBONS (MG/KG)         Image: Company of the company of	MONOBUTYLTIN	50 U	NA	NA	50 U	50 U	NA	NA	NA	NA	49 U	NA	NA	50 U
PETROLEUM HYDROCARBONS (MG/KG)         NA         NA         53 U         53 U         NA	TETRABUTYLTIN	50 U	NA	NA	2.9 J	50 U	NA	NA	NA	NA	49 U	NA	NA	27 J
HYDROCARBONS (MG/KG)         Image: Continuous of the continuous of th	TRIBUTYLTIN	2.2 J	NA	NA	50 U	50 U	NA	NA	NA	NA	49 U	NA	NA	50 U
TOTAL PETROLEUM NA NA NA NA NA NA NA NA NA NA NA NA NA														
HYDROCARBONS TCLP METALS (UG/L)	CREOSOTE	76 U	NA	NA	53 U	53 U	NA	NA	NA	NA	52 U	NA	NA	56 U
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC 4 U NA NA 4 U 4 U NA NA NA 67.2 NA NA	TCLP METALS (UG/L)													
	ARSENIC	4 U	NA	NA	4 U	4 U	NA	NA	NA	NA	67.2	NA	NA	22.6 U
BARIUM 53.8 NA NA 69.9 128 NA NA NA NA 366 NA NA	BARIUM	53.8	NA	NA	69.9	128	NA	NA	NA	NA	366	NA	NA	143 U
CADMIUM 3 U NA NA 3 U NA NA NA NA NA NA NA NA	CADMIUM	3 U	NA	NA	3 U	3 U	NA	NA	NA	NA	3 U	NA	NA	3 U

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 54 of 63

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	MW02-	TP05-	TP06-	TP08-	TP08-	TP09-	TP09-	TP10-	TP10-	TP11-	TP11-	TP13-	TP13-
	1820	1213	1213	0910	0406	0910	0406	1213	0507	1213	0507	1011	0506
LOCATION ID	DSY-MW-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	05	06	08	80	09	09	10	10	11	11	13	13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	NA	NA	6 U	6 U	NA	NA	NA	NA	13.3 UJ	NA	NA	6.3 UJ
LEAD	24.7	NA	NA	3.4 U	4.8 U	NA	NA	NA	NA	56.2	NA	NA	5.5
MERCURY	0.1 U	NA	NA	0.54 UJ	0.42 UJ	NA	NA	NA	NA	0.13 UJ	NA	NA	0.1 UJ
SELENIUM	4 U	NA	NA	6.3 U	6.3 U	NA	NA	NA	NA	18	NA	NA	4 U
SILVER	6 U	NA	NA	6 U	6 U	NA	NA	NA	NA	36.4 UJ	NA	NA	0 R

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 55 of 63

SAMPLE ID	DSY-S-	DSY-S-	B6-S6	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DPSOIL0
	MW02-	TP13-		TP24-	TP24-	TP24-	TP24-	TP25-	TP25-	2
	1820	0506-D		1011	0102	0102-D	0507	1011	0507	
LOCATION ID	DSY-MW-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	13	14	24	24	24	24	25	25	DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)										
1,1,1-TRICHLOROETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
1,1,2,2-	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
TETRACHLOROETHANE										
1,1,2-TRICHLOROETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
1,1-DICHLOROETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
1,1-DICHLOROETHENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
1,2-DICHLOROETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
1,2-DICHLOROPROPANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
2-BUTANONE	12 U	22 U	NA	NA	14	11 U	NA	12 U	NA	NA
2-HEXANONE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
4-METHYL-2-PENTANONE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
ACETONE	12 U	87 U	NA	NA	99 J	33 J	NA	18 U	NA	NA
BENZENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
BROMODICHLOROMETHAN E	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
BROMOFORM	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
BROMOMETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CARBON DISULFIDE	2 J	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CARBON TETRACHLORIDE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CHLOROBENZENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CHLORODIBROMOMETHAN E	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CHLOROETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CHLOROFORM	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CHLOROMETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 56 of 63

SAMPLE ID	DSY-S-	DSY-S-	B6-S6	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DPSOIL0
	MW02-	TP13-		TP24-	TP24-	TP24-	TP24-	TP25-	TP25-	2
	1820	0506-D		1011	0102	0102-D	0507	1011	0507	
LOCATION ID	DSY-MW-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	13	14	24	24		24	25	25	DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
DICHLOROPROPENE										
ETHYLBENZENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
METHYLENE CHLORIDE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
STYRENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
TETRACHLOROETHENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
TOLUENE	12 U	12 U	NA	NA	2 J	11 U	NA	12 U	NA	NA
TOTAL 1,2-	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
DICHLOROETHENE										
TOTAL XYLENES	12 U	12 U	NA	NA	2 J		NA	12 U	NA	NA
TRANS-1,3- DICHLOROPROPENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
TRICHLOROETHENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
VINYL CHLORIDE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
SEMIVOLATILES (UG/KG)										
1,2,4-TRICHLOROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
1,2-DICHLOROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
1,3-DICHLOROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
1,4-DICHLOROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2,2'-OXYBIS(1- CHLOROPROPANE)	420 UJ	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2,4,5-TRICHLOROPHENOL	1100 U	1000 U	NA	NA	960 U	930 U	NA	1000 U	NA	NA
2,4,6-TRICHLOROPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2,4-DICHLOROPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2,4-DIMETHYLPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 57 of 63

SAMPLE ID	DSY-S-	DSY-S-	B6-S6	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DPSOIL0
	MW02-	TP13-		TP24-	TP24-	TP24-	TP24-	TP25-	TP25-	2
	1820	0506-D		1011	0102	0102-D	0507	1011	0507	
LOCATION ID	DSY-MW-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	13	14	24	24	24	24	25	25	DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	1000 UJ	NA	NA	960 U	930 UJ	NA	1000 UJ	NA	NA
2,4-DINITROTOLUENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2,6-DINITROTOLUENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2-CHLORONAPHTHALENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2-CHLOROPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2-METHYLNAPHTHALENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2-METHYLPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2-NITROANILINE	1100 U	1000 U	NA	NA	960 U	930 U	NA	1000 U	NA	NA
2-NITROPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
3,3'-DICHLOROBENZIDINE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
3-NITROANILINE	1100 U	1000 U	NA	NA	960 U	930 U	NA	1000 U	NA	NA
4,6-DINITRO-2- METHYLPHENOL	1100 U	1000 U	NA	NA	960 U	930 UJ	NA	1000 U	NA	NA
4-BROMOPHENYL PHENYL ETHER	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
4-CHLORO-3- METHYLPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
4-CHLOROANILINE	420 UJ	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
4-CHLOROPHENYL PHENYL ETHER	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
4-METHYLPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
4-NITROANILINE	1100 U	1000 U	NA	NA	960 U	930 U	NA	1000 U	NA	NA

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# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 58 of 63

SAMPLE ID	DSY-S-	DSY-S-	B6-S6	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DPSOIL0
	MW02-	TP13-		TP24-	TP24-	TP24-	TP24-	TP25-	TP25-	2
	1820	0506-D		1011	0102	0102-D	0507	1011	0507	
LOCATION ID	DSY-MW-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	_	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	13	14	24	24	24	24	25	25	DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	1000 UJ	NA	NA	960 U	930 U	NA	1000 UJ	NA	NA
ACENAPHTHENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
ACENAPHTHYLENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
ANTHRACENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
BENZO(A)ANTHRACENE	420 U	400 U	90 J	NA	380 U	53 J	NA	47 J	NA	NA
BENZO(A)PYRENE	420 UJ	400 UJ	87 J	NA	380 U	44 J	NA	42 J	NA	NA
BENZO(B)FLUORANTHENE	420 UJ	400 UJ	150 J	NA	380 U	71 J	NA	70 J	NA	NA
BENZO(G,H,I)PERYLENE	420 UJ	400 UJ	45 J	NA	380 U	370 U	NA	400 UJ	NA	NA
BENZO(K)FLUORANTHENE	420 UJ	400 UJ	52 J	NA	380 U	370 U	NA	400 UJ	NA	NA
BIS(2- CHLOROETHOXY)METHAN E	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
BIS(2- CHLOROETHYL)ETHER	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
BIS(2- ETHYLHEXYL)PHTHALATE	420 U	400 U	NA	NA	97 J	43 J	NA	400 U	NA	160 J
BUTYL BENZYL PHTHALATE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
CARBAZOLE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
CHRYSENE	420 U	400 U	130 J	NA	380 U	44 J	NA	67 J	NA	NA
DIBENZO(A,H)ANTHRACEN E	420 UJ	400 UJ	NA	NA	380 U	370 U	NA	400 UJ	NA	NA
DIBENZOFURAN	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
DIETHYL PHTHALATE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
DIMETHYL PHTHALATE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 59 of 63

SAMPLE ID	DSY-S- MW02- 1820	DSY-S- TP13- 0506-D	B6-S6	DSY-S- TP24- 1011	DSY-S- TP24- 0102		DSY-S- TP24- 0507	DSY-S- TP25- 1011	DSY-S- TP25- 0507	DPSOIL0 2
LOCATION ID	DSY-MW-	_	_	DSY-TP- 24	DSY-TP-	DSY-TP- 24	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
CAMPLE DATE	02 08/08/96	13 07/26/96	14 01/01/00	07/23/96	24 07/23/96		24 07/23/96	25 07/25/96	25 07/25/96	DPSOIL 01/01/99
SAMPLE DATE										
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP		NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
DI-N-OCTYL PHTHALATE	420 UJ	400 UJ	NA	NA	380 U	370 U	NA	400 UJ	NA	NA
FLUORANTHENE	420 U	400 U	170 J	NA	380 U	81 J	NA	97 J	NA	84 J
FLUORENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
HEXACHLOROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
HEXACHLOROBUTADIENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
HEXACHLOROCYCLOPENT ADIENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
HEXACHLOROETHANE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
HIGH MOLECULAR WEIGHT PAHS	420 U	400 U	874	NA	380 U	293	NA	443	NA	NA
INDENO(1,2,3-CD)PYRENE	420 UJ	400 UJ	NA	NA	380 U	370 U	NA	400 UJ	NA	NA
ISOPHORONE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
LOW MOLECULAR WEIGHT PAHS	420 U	43	NA	NA	380 U	54	NA	81	NA	140
NAPHTHALENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	77 J
NITROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
N-NITROSO-DI-N- PROPYLAMINE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
N- NITROSODIPHENYLAMINE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
PENTACHLOROPHENOL	1100 U	1000 U	NA	NA	960 U	930 U	NA	1000 U	NA	NA
PHENANTHRENE	420 U	43 J	130 J	NA	380 U	54 J	NA	81 J	NA	63 J
PHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
PYRENE	420 U	400 U	150 J	NA	380 U	370 U	NA	120 J	NA	58 J

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 60 of 63

SAMPLE ID	DSY-S-	DSY-S-	B6-S6	DSY-S-	DSY-S-		DSY-S-	DSY-S-	DSY-S-	DPSOIL0
	MW02-	TP13-		TP24-	TP24-		TP24-	TP25-	TP25-	2
LOCATION ID	1820 DSY-MW-	0506-D DSY-TP-	DSY-TP-	1011 DSY-TP-	0102 DSY-TP-	0102-D DSY-TP-	0507 DSY-TP-	1011 DSY-TP-	0507 DSY-TP-	DSY-TP-
LOCATION ID	02 02	13	14	DSY-1P- 24	24	24	DSY-1P- 24	25	25	DSY-TP- DPSOIL
SAMPLE DATE	08/08/96	07/26/96		07/23/96	07/23/96		07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	43	1004	NA	380 U	347	NA	524	NA	282
PESTICIDES/PCBS (UG/KG)										
===										
4,4'-DDD	0 R	4 U	NA	NA	3.4 UJ		NA	4 U	NA	NA
4,4'-DDE	0 R	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
4,4'-DDT	4.3 U	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ALDRIN	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U		NA
ALPHA-BHC	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U		NA
ALPHA-CHLORDANE	0 R	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
AROCLOR-1016	43 U	40 U	NA	NA	34 UJ	35 U	NA	40 U		NA
AROCLOR-1221	85 U	40 U	NA	NA	34 UJ	35 U	NA	40 U	NA	NA
AROCLOR-1232	43 U	40 U	NA	NA	34 UJ	35 U	NA	40 U	NA	NA
AROCLOR-1242	43 U	40 U	NA	NA	34 UJ	35 U	NA	40 U	NA	NA
AROCLOR-1248	43 U	40 U	NA	NA	34 UJ	35 U	NA	40 U	NA	NA
AROCLOR-1254	43 U	40 U	NA	NA	34 UJ	35 U	NA	40 U	NA	NA
AROCLOR-1260	43 U	40 U	NA	NA	34 UJ	35 U	NA	13 J	NA	NA
BETA-BHC	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
DELTA-BHC	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
DIELDRIN	0 R	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ENDOSULFAN I	0 R	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
ENDOSULFAN II	0 R	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ENDOSULFAN SULFATE	4.3 U	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ENDRIN	0 R	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ENDRIN ALDEHYDE	4.3 U	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ENDRIN KETONE	4.3 U	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 61 of 63

SAMPLE ID	DSY-S-	DSY-S-	B6-S6	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DPSOIL0
	MW02-	TP13-		TP24-	TP24-	TP24-	TP24-	TP25-	TP25-	2
	1820	0506-D		1011	0102	0102-D	0507	1011	0507	
LOCATION ID	DSY-MW-	_	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	13	14	24	24	24	24	25	25	DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00		07/23/96		07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
GAMMA-CHLORDANE	0 R	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
HEPTACHLOR	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
HEPTACHLOR EPOXIDE	0 R	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
METHOXYCHLOR	22 U	21 U	NA	NA	18 UJ	18 U	NA	21 U	NA	NA
PCB-209	4.3 U	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
SUM OF PCB CONGENERS	4.3 U	4 U	NA	NA	3.4 U	3.5 U	NA	4 U	NA	NA
X 2										
TOTAL AROCLOR	NA	NA		NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	220 U	210 U	NA	NA	180 UJ	180 U	NA	210 U	NA	NA
METALS (MG/KG)										
ALUMINUM	4890	11200	NA	6600	4940	4960	5920	10800	11100	NA
ANTIMONY	11.8 UJ	9.6 UJ	NA	7.8 UJ	8.1 UJ	8.1 UJ	7.8 UJ	10.5 UJ	11.3 UJ	NA
ARSENIC	4.3	18	16	3.4	5.7 J	5.5 J	5.1	13	15.6	NA
BARIUM	3.2	25.7	NA	12.7	13 J	12.9 J	10.9	18.4	18.5	NA
BERYLLIUM	0.23 U	0.42 J	NA	0.27 J	0.25 J	0.19 J	0.23 J	0.38 J	0.44 J	NA
CADMIUM	0.68 U	0.55 UJ	1.4	0.45 UJ	0.46 U	0.47 U	0.45 UJ	0.61 UJ	1.2 UJ	NA
CALCIUM	3480	414	NA	480	318	305	635	1650	1160	NA
CHROMIUM	10.9 J	14.3	10	9	6.3	6.1	9.5	13	10.1	NA
COBALT	5.2	11 J	NA	7.2 J	9	9	7 J	10.1 J	13.1	NA
COPPER	8.6	11	NA	19.6	20.7	18.7	13.4	25.1	27.9	NA
IRON	13500	24700	NA	17100	17700	17400	18200	24800	27400	NA
LEAD	6 J	11.3	23	7.9	7.5 J	7.3 J	6.3	18.6	26.4	NA
MAGNESIUM	1950	2460	NA	2290	1920	1910	2280	3240	3220	NA
MANGANESE	97.9	584 J	NA	213 J	400 J	329 J	210 J	378 J	377	NA

## TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 62 of 63

SAMPLE ID	DSY-S-	DSY-S-	B6-S6	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DPSOIL0
	MW02-	TP13-		TP24-	TP24-	TP24-	TP24-	TP25-	TP25-	2
	1820	0506-D		1011	0102	0102-D	0507	1011	0507	
LOCATION ID	DSY-MW-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	02	13	14	24	24	24	24	25	25	DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	0.13 U	NA	0.09 UJ	0.05 U	0.05 U	0.08 UJ	0.11 U	0.05 U	NA
NICKEL	8.9	16.5	NA	14.3	15.7 UJ	14.9	14.4	20	22.7	NA
POTASSIUM	191	238	NA	301	407	448	361	363	350	NA
SELENIUM	0.91 UJ	0.74 U	NA	0.6 U	0.69 J	0.63 J	0.6 J	0.86 J	0.87 U	NA
SILVER	1.4 UJ	1.1 U	NA	0.89 U	0.93 U	0.93 U	0.9 U	1.2 U	1.3 U	NA
SODIUM	66.3 U	94.5	NA	28.9 U	23.1	23	33.2 U	97.8	66.9 UJ	NA
THALLIUM	1.4 U	1.1 UJ	NA	0.89 UJ	0.93 UJ	0.93 UJ	0.9 UJ	1.2 UJ	1.3 U	NA
VANADIUM	11	18 J	NA	9.5 J	9 J	8.9 J	10.9 J	15.2 J	17.6 J	NA
ZINC	37	40.2	NA	35.4	40.1	39.1	36.8	56.7	62.1	NA
MISCELLANEOUS										
PARAMETERS (UG/KG)										
DIBUTYLTIN	50 U	49 U	NA	NA	50 UJ	49 UJ	NA	50 U	NA	NA
MONOBUTYLTIN	50 U	49 U	NA	NA	50 UJ	49 UJ	NA	50 U	NA	NA
TETRABUTYLTIN	50 U	4.6 J	NA	NA	3.3 J	8.5 J	NA	50 U	NA	NA
TRIBUTYLTIN	2.2 J	49 U	NA	NA	50 UJ	49 UJ	NA	50 U	NA	NA
PETROLEUM										
HYDROCARBONS (MG/KG)										
CREOSOTE	76 U	60 U	NA	NA	180 U	170 U	NA	150	NA	NA
TOTAL PETROLEUM	NA	NA	21	NA	NA	NA	NA	NA	NA	NA
HYDROCARBONS										
TCLP METALS (UG/L)										
ARSENIC	4 U	24.3 U	NA	NA	5.8 J	4 U	NA	16.7 U	NA	NA
BARIUM	53.8	283	NA	NA	109 U	225	NA	129 U	NA	NA
CADMIUM	3 U	3 U	NA	NA	3 U	4 UJ	NA	3 U	NA	NA

## TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 63 of 63

SAMPLE ID	DSY-S-	DSY-S-	B6-S6	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DPSOIL0
	MW02- 1820	TP13- 0506-D		TP24- 1011	TP24- 0102	TP24- 0102-D	TP24- 0507	TP25- 1011	TP25- 0507	2
LOCATION ID	DSY-MW-	DSY-TP- 13	DSY-TP- 14	DSY-TP- 24	DSY-TP- 24	DSY-TP- 24	DSY-TP- 24	DSY-TP- 25	DSY-TP- 25	DSY-TP- DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	6 U	NA	NA	6 U	6 U	NA	6 U	NA	NA
LEAD	24.7	5	NA	NA	3.6 U	1.2 UJ	NA	21.9	NA	NA
MERCURY	0.1 U	0.1 UJ	NA	NA	0.1 U	0.1 U	NA	0.1 UJ	NA	NA
SELENIUM	4 U	4 U	NA	NA	8.3 U	5.1 UJ	NA	4 U	NA	NA
SILVER	6 U	0 R	NA	NA	6 U	6 U	NA	0 R	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP12-	TP15-	TP15-	TP16-	TP16-	TP17-	TP17-	TP18-	TP18-	TP19-	TP19-	TP20-
	1213	0507	1112	0506	1112	0506	1112	0507	1011	0507	1011	0507	1011
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	12	15	15	16	16	17	17	18	18	19	19	20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
TETRACHLOROETHANE													
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHAN E	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROBENZENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CHLORODIBROMOMETHAN E	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROFORM	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROMETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP12-	TP15-	TP15-	TP16-	TP16-	TP17-	TP17-	TP18-	TP18-	TP19-	TP19-	TP20-
	1213	0507	1112	0506	1112	0506	1112	0507	1011	0507	1011	0507	1011
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	12	15	15	16	16	17	17	18	18	19	19	20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA NA
DICHLOROPROPENE													
ETHYLBENZENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	
METHYLENE CHLORIDE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	
STYRENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA NA
TETRACHLOROETHENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA NA
TOLUENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA NA
TOTAL 1,2-	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA NA
DICHLOROETHENE													
TOTAL XYLENES	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	
TRANS-1,3-	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA NA
DICHLOROPROPENE													<u> </u>
TRICHLOROETHENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA		
VINYL CHLORIDE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA NA
2,2'-OXYBIS(1-	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA NA
CHLOROPROPANE)													
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	
2,4,6-TRICHLOROPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	. NA
2,4-DIMETHYLPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	. NA
2,4-DINITROPHENOL	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA NA

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# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 of 27

SAMPLE ID	DSY-S- TP12- 1213	DSY-S- TP12- 0507	DSY-S- TP15- 1112	DSY-S- TP15- 0506	DSY-S- TP16- 1112	DSY-S- TP16- 0506	DSY-S- TP17- 1112		DSY-S- TP18- 1011	DSY-S- TP18- 0507	DSY-S- TP19- 1011	DSY-S- TP19- 0507	DSY-S- TP20- 1011
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-			DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
EGGATION ID	12	12	15	15	16	16	17	17	18	18	19	19	20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-NITROANILINE	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-NITROPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
3-NITROANILINE	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
4,6-DINITRO-2- METHYLPHENOL	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-BROMOPHENYL PHENYL ETHER	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLORO-3- METHYLPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLOROPHENYL PHENYL ETHER	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-NITROANILINE	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-NITROPHENOL	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHYLENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
· · · · · · · · · · · · · · · · · · ·	TP12-	TP12-	TP15-	TP15-	TP16-	TP16-	TP17-	TP17-	TP18-	TP18-	TP19-	TP19-	TP20-
	1213	0507	1112	0506	1112	0506	1112	0507	1011	0507	1011	0507	1011
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	12	15	15	16	16	17	17	18	18	19	19	20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
BENZO(A)ANTHRACENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2- CHLOROETHOXY)METHAN E	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2- CHLOROETHYL)ETHER	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2- ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BUTYL BENZYL PHTHALATE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
CARBAZOLE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACEN E	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
DIBENZOFURAN	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
DIETHYL PHTHALATE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
DIMETHYL PHTHALATE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
DI-N-BUTYL PHTHALATE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 5 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP12-	TP15-	TP15-	TP16-	TP16-	TP17-	TP17-	TP18-	TP18-	TP19-	TP19-	TP20-
	1213	0507	1112	0506	1112	0506	1112	0507	1011	0507	1011	0507	1011
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	12	15	15	16	16	17	17	18	18	19	19	20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-OCTYL PHTHALATE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
FLUORENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENT ADIENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
HIGH MOLECULAR WEIGHT PAHS	NA	NA	NA	NA	1600	NA	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
ISOPHORONE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
LOW MOLECULAR WEIGHT PAHS	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
NITROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
N-NITROSO-DI-N- PROPYLAMINE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
N- NITROSODIPHENYLAMINE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
PHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA	1600 J	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 6 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP12-	TP15-	TP15-	TP16-	TP16-	TP17-	TP17-	TP18-	TP18-	TP19-	TP19-	TP20-
	1213	0507	1112	0506	1112	0506	1112	0507	1011	0507	1011	0507	1011
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	12	15	15	16	16	17	17	18	18	19	19	20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	NA	NA	NA	NA	1600	NA	NA	NA	NA	NA	NA	NA	NA
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	4.4 J	NA	NA	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	15	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 7 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP12-	TP15-	TP15-	TP16-	TP16-	TP17-	TP17-	TP18-	TP18-	TP19-	TP19-	TP20-
	1213	0507	1112	0506	1112	0506	1112	0507	1011	0507	1011	0507	1011
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	12	15	15	16	16	17		18	18	19	19	20
SAMPLE DATE	07/26/96		07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96			07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	3.1 J	NA	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	19 U	NA	NA	NA	NA	NA	NA	NA	NA
PCB-209	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
SUM OF PCB CONGENERS X 2	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	190 U	NA	NA	NA	NA	NA	NA	NA	NA
METALS (MG/KG)													
ALUMINUM	14300	11700	7360	10200	7820	2470	8330	6420	3860	3300	2950	2620	3350
ANTIMONY	11.7 UJ	11.2 UJ	10.8 UJ	11.1 UJ	10.4 UJ	10.9 UJ	10.2 UJ	10.6 UJ	11.4 UJ	10.8 UJ	13.2 UJ	10.2 UJ	13.1 UJ
ARSENIC	37.3	24.1	6.1 J	11.4	16.6	3.1 J	8.7	13.6	3.8 J	4.4 J	3 J	2.7 J	4.3 J
BARIUM	11.3	13.8	9.4	15	6.3	2.6 U	16.1	8.5	5.7 U	3.4 U	4.8 U	3 U	5 U
BERYLLIUM	0.44 J	0.52	0.39 J	0.49	0.27 J	0.21 U	0.24 J	0.4 J	0.22 U	0.21 U	0.25 U	0.2 U	0.25 U
CADMIUM	1.3 UJ	1.1 UJ	1.1 UJ	1 UJ	0.6 UJ	1.1 UJ	0.59 U	0.99 UJ	0.66 U	0.63 U	0.76 U	0.6 UJ	0.76 U
CALCIUM	1070	891	690	872	1110	326	785	589	506	441	465	379	603
CHROMIUM	12.6	10.4	6.8	10.1	12.3	2.2	7.2	6.3	4.3	3.4	3.4	3.6	4.4
COBALT	18.5	12.7	8.5	13.6	9.4 J	2.6 UJ	10.6	16.2	6	3.1 UJ	5.7	3.1 UJ	5.8
COPPER	26	18.6	14.3	23.7	15.2	4.1 UJ	16	25.7	10.4	7.3	4.8 UJ	6.2	6.7
IRON	35000	30200	17300	25200	23600	8170	20400	17700	11100	10900	8020	8340	12000
LEAD	21.2	12.1	5.7	11.2	16.1	1.6 J	10.5	13	4.6	2.7	1.9 J	2.1	4
MAGNESIUM	4530	3450	2470	3570	2680	956	2820	2240	1500	1280	1130	956	1440
MANGANESE	514	315	225	326	262 J	102	524	340	421	75	83.6	55.4	173
MERCURY	0.05 U	0.06 U	0.05 U	0.05 U	0.11 U	0.15 UJ	0.05 U	0.05 U	0.06 UJ	0.06 UJ	0.12 UJ	0.07 UJ	0.12 UJ

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# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 8 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
O, 22 13	TP12-	TP12-	TP15-	TP15-		TP16-	TP17-		TP18-	TP18-	TP19-	TP19-	TP20-
	1213	0507	1112	0506	1112	0506	1112	0507	1011	0507	1011	0507	1011
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	12	15	15	16	16	17	17	18	18	19	19	20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96		07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
NICKEL	30.4	23.2	13.8	22.8	18.3	5.1	18	14.6	6.8	6.9	9.2	5.2	7.8
POTASSIUM	241	267	329	427	187	138	263	259	224	232	186	179	227
SELENIUM	0.9 U	0.86 U	0.83 U	0.86 U	0.8 U	0.83 U	0.79 U	0.82 U	0.87 U	0.83 U	1 U	0.79 U	1 U
SILVER	1.6 J	1.3 U	1.2 U	1.3 U	1.2 U	1.3 U	1.2 U	1.2 U	1.3 U	1.3 U	1.5 U	1.2 U	1.5 U
SODIUM	50.4 UJ	44.2 UJ	26.1 UJ	32.3 UJ	26.1 U	30.1 UJ	33.8 UJ	33.6 UJ	34.9 UJ	25.9 UJ	34 UJ	22.2 UJ	117
THALLIUM	1.4 U	1.3 U	1.2 U	1.3 U	1.2 UJ	1.3 U	1.2 U	1.2 U	1.3 U	1.3 U	1.5 U	1.2 U	1.5 U
VANADIUM	18.8 J	17.1 J	11.4	15.9 J	14.2 J	5.6	11.9 J	9.7	6.5	7.1	6.2	6.2	7.6
ZINC	66.1	50.9	35.4	50.6	50.5	14.6	38.8	41.5	20.6	18.2	23.6	16.4	24.5
MISCELLANEOUS													
PARAMETERS (UG/KG)													
DIBUTYLTIN	NA	NA	NA	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA
MONOBUTYLTIN	NA	NA	NA	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA
TETRABUTYLTIN	NA	NA	NA	NA	5.1 J	NA	NA	NA	NA	NA	NA	NA	NA
TRIBUTYLTIN	NA	NA	NA	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA
PETROLEUM													
HYDROCARBONS (MG/KG)													
CREOSOTE	NA	NA	NA	NA	1200	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	NA	NA	NA	NA	4 U	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	NA	NA	NA	NA	70 U	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	NA	NA	NA	NA	3 U	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	NA	NA	NA	NA	6 U	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	NA	NA	NA	NA	6.1	NA	NA	NA	NA	NA	NA	NA	NA
MERCURY	NA	NA	NA	NA	0.1 UJ	NA	NA	NA	NA	NA	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 9 of 27

J	DSY-S- TP12- 1213	DSY-S- TP12- 0507	TP15-	TP15-	TP16-	DSY-S- TP16- 0506	TP17-	TP17-	TP18-	DSY-S- TP18- 0507	TP19-	DSY-S- TP19- 0507	DSY-S- TP20- 1011
LOCATION ID	DSY-TP- 12	DSY-TP- 12	DSY-TP- 15	DSY-TP- 15	DSY-TP- 16	DSY-TP- 16	DSY-TP- 17	DSY-TP- 17	DSY-TP- 18	DSY-TP- 18	DSY-TP- 19	DSY-TP- 19	DSY-TP- 20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
SELENIUM	NA	NA	NA	NA	4 U	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	NA	NA	NA	NA	0 R	NA	NA	NA	NA	NA	NA	NA	NA

## TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 10 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP20-	TP21-	TP21-	TP22-	TP22-	TP23-	TP23-	TP26-	TP26-	TP26-	TP27-	TP27-
	1213	0507	1011	0507	1112	0506	0910	0507	0910	0305	0406	1011	0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	20	21	21	22	22	23	23	26	26	26	27	27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
1,1,2,2-	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
TETRACHLOROETHANE													
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 UJ	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
ACETONE	NA	NA	NA	NA	NA	NA	16	NA	NA	110 U	NA	NA	NA
BENZENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
BROMODICHLOROMETHAN E	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CHLOROBENZENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CHLORODIBROMOMETHAN E	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CHLOROFORM	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CHLOROMETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA

## TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 11 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-			DSY-S-			DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12- 1213	TP20- 0507	TP21- 1011	TP21- 0507	TP22- 1112	TP22- 0506	TP23- 0910	TP23- 0507	TP26- 0910	TP26- 0305	TP26- 0406	TP27- 1011	TP27- 0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	20	21	21	22	22	23	23	26	26	26	27	27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
DICHLOROPROPENE													
ETHYLBENZENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	66 J	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	NA	12 U		NA	110 U	NA	NA	
STYRENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
TETRACHLOROETHENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	
TOLUENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
TOTAL 1,2- DICHLOROETHENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
TOTAL XYLENES	NA	NA	NA	NA	NA	NA	12 U	NA	NA	150	NA	NA	NA
TRANS-1,3- DICHLOROPROPENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
TRICHLOROETHENE	NA	NA	NA	NA	NA	NA	1 J	NA	NA	110 U	NA	NA	NA
VINYL CHLORIDE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2,2'-OXYBIS(1- CHLOROPROPANE)	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 UJ	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA

## TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 12 of 27

SAMPLE ID	DSY-S- TP12- 1213	DSY-S- TP20- 0507	DSY-S- TP21- 1011	TP21- 0507	TP22- 1112	TP22- 0506	DSY-S- TP23- 0910	TP23- 0507	TP26- 0910	DSY-S- TP26- 0305	DSY-S- TP26- 0406	DSY-S- TP27- 1011	DSY-S- TP27- 0507
LOCATION ID	DSY-TP- 12	DSY-TP- 20	DSY-TP- 21	DSY-TP- 21	DSY-TP- 22	DSY-TP- 22	DSY-TP- 23	DSY-TP- 23	DSY-TP- 26	DSY-TP- 26	DSY-TP- 26	DSY-TP- 27	DSY-TP- 27
SAMPLE DATE	07/26/96	-	07/24/96	07/24/96		07/24/96	07/23/96	_	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT		11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	14000	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2-NITROANILINE	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
2-NITROPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
3-NITROANILINE	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
4,6-DINITRO-2- METHYLPHENOL	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
4-BROMOPHENYL PHENYL ETHER	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
4-CHLORO-3- METHYLPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
4-CHLOROPHENYL PHENYL ETHER	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
4-NITROANILINE	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
4-NITROPHENOL	NA	NA	NA	NA	NA	NA	1000 UJ	NA	NA	9900 U	NA	NA	NA
ACENAPHTHENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
ACENAPHTHYLENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	900 J	NA	NA	NA

## TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 13 of 27

SAMPLE ID	DSY-S-		DSY-S-			DSY-S-	DSY-S-		DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12- 1213	TP20- 0507	TP21- 1011	TP21- 0507	TP22- 1112	TP22- 0506	TP23- 0910	TP23- 0507	TP26- 0910	TP26- 0305	TP26- 0406	TP27- 1011	TP27- 0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	20	21	21	22	22	23	23	26	26	26	27	27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BIS(2- CHLOROETHOXY)METHAN E	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BIS(2- CHLOROETHYL)ETHER	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BIS(2- ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	NA	NA	65 J	NA	NA	3900 U	NA	NA	NA
BUTYL BENZYL PHTHALATE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
CARBAZOLE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
DIBENZO(A,H)ANTHRACEN E	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
DIBENZOFURAN	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	
DIETHYL PHTHALATE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
DIMETHYL PHTHALATE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	
DI-N-BUTYL PHTHALATE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA

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## TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 14 of 27

SAMPLE ID	DSY-S- TP12-		DSY-S- TP21-	DSY-S- TP21-		DSY-S- TP22-	DSY-S- TP23-		DSY-S- TP26-	DSY-S- TP26-		DSY-S- TP27-	DSY-S- TP27-
	1213	0507	1011	0507	1112	0506	0910		0910	0305	0406	1011	0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	20	21	21	22	22	23	23	26	26	26	27	27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-OCTYL PHTHALATE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
FLUORENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	2100 J	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
HEXACHLOROCYCLOPENT ADIENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
HIGH MOLECULAR WEIGHT PAHS	NA	NA	NA	NA	NA	NA	410 U	NA	NA	460	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
ISOPHORONE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
LOW MOLECULAR WEIGHT PAHS	NA	NA	NA	NA	NA	NA	410 U	NA	NA	24000	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	2200 J	NA	NA	NA
NITROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
N-NITROSO-DI-N- PROPYLAMINE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
N- NITROSODIPHENYLAMINE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	4800	NA	NA	NA
PHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
PYRENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	460 J	NA	NA	NA

## TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 15 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP20-	TP21-	TP21-	TP22-	TP22-	TP23-	TP23-	TP26-	TP26-	TP26-	TP27-	TP27-
	1213	0507	1011	0507	1112	0506	0910	0507	0910	0305	0406	1011	0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	20	21	21	22	22	23	23	26	26	26	27	27
SAMPLE DATE	07/26/96					07/24/96				07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	NA	NA	NA	NA	NA	NA	410 U	NA	NA	24460	NA	NA	NA
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA

## TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 16 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP20-	TP21-	TP21-	TP22-	TP22-	TP23-	TP23-	TP26-	TP26-	TP26-	TP27-	TP27-
	1213	0507	1011	0507	1112	0506	0910	0507	0910	0305	0406	1011	0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	20	21	21		22	23		26	26		27	27
SAMPLE DATE	07/26/96					07/24/96			07/26/96	07/29/96		08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT		5 FT	9 FT		9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT		11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL		NORMAL	NORMAL		NORMAL	NORMAL		NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	4	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA	18 U	NA	NA	20 U	NA	NA	NA
PCB-209	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
SUM OF PCB CONGENERS X 2	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA	180 U	NA	NA	200 U	NA	NA	NA
METALS (MG/KG)													
ALUMINUM	14300	4070	3740	3010	10000	7700	5810	6060	10200	1690	10100	2570	3480
ANTIMONY	11.7 UJ	11.1 UJ	13.4 UJ	10.6 UJ	10.4 UJ	11.8 UJ	8.7 UJ	10.6 UJ	9.4 UJ	9.7 UJ	10.5 UJ	9.3 UJ	10.6 UJ
ARSENIC	37.3	3.9 J	2.7 J	3.1 J	7	8.1	4.6 J	5.5	17.8	1.2 J	42	4.7 UJ	4.1 UJ
BARIUM	11.3	4.3 U	4.3 U	6 U	24.9	17.6	10.1	10.1	33.6	9.7	28.7	2.4 UJ	2.1 UJ
BERYLLIUM	0.44 J	0.21 U	0.26 U	0.2 U	0.35 J	0.3 J	0.24 J	0.22 J	0.51	0.19 U	0.44 J	0.18 UJ	0.2 UJ
CADMIUM	1.3 UJ	0.65 UJ	0.77 U	0.61 U	0.65 J	0.81 UJ	0.5 U	0.61 UJ	0.54 U	0.56 U	0.6 U	0.54 UJ	0.61 UJ
CALCIUM	1070	423	507	448	529	454	493	556	1720	1590	1100	472	543
CHROMIUM	12.6	4	4.8	2.8	14.6	7.6	7	8.4	20.1	2.2 J	14.8	3.7 J	5.7 J
COBALT	18.5	3 UJ	5	3.2 UJ	13.8 J	9.9	8.3	8.9	11.5	1.1 J	11.5	3 J	4 J
COPPER	26	6.2	5.8	5.4	16.8	17.7	19.9	18.2	34.7	34.9	21.9	4.1 J	5 J
IRON	35000	11200	10600	9380	25600	18400	16200	18900	24700	4060	25500	6970	10400
LEAD	21.2	3.2	3.6	3.4	8.6	6.3	6.2 J	7.3	28.4 J	3.2 J	75 J	1.6 J	2.5 J
MAGNESIUM	4530	1470	1460	1150	3460	2460	2130	2180	2390	534	2850	1030	1340
MANGANESE	514	70.4	125	93.2	549 J	322	218 J	308	363	108	342	55.4 J	106 J
MERCURY	0.05 U	0.08 UJ	0.09 UJ	0.06 UJ	0.08 UJ	0.18 UJ	0.06 U	0.1 UJ	0.05 U	0.05 U	0.06	0.06 U	0.05 U

## TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 17 of 27

SAMPLE ID	DSY-S- TP12-	DSY-S- TP20-	DSY-S- TP21-	DSY-S- TP21-	DSY-S- TP22-	DSY-S- TP22-	DSY-S- TP23-		DSY-S- TP26-	DSY-S- TP26-		DSY-S- TP27-	DSY-S- TP27-
	1213	0507	1011	0507	1112	0506	0910	-	0910	0305	0406	1011	0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	20	21	21	22	22	23	_	26	26	26	27	27
SAMPLE DATE	07/26/96		07/24/96	07/24/96		07/24/96			07/26/96	07/29/96		08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT		5 FT			9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
NICKEL	30.4	7.5	11.4	6.8	25	16.6	14.1 UJ	14.1	25.5 J	2.3 J	18.8 J	5.2 J	6.2 J
POTASSIUM	241	191	188	187	639	518	306	314	444	265	469	134	132
SELENIUM	0.9 U	0.85 U	1 U	0.81 U	0.8 U	0.91 U	0.67 U	1.1	0.72 U	0.75 U	0.81 J	0.83 J	0 R
SILVER	1.6 J	1.3 U	1.5 U	1.2 U	1.2 U	1.4 U	1 U	1.2 U	1.1 UJ	1.1 UJ	1.2 UJ	1.1 UJ	1.2 UJ
SODIUM	50.4 UJ	29.6 UJ	50.4 UJ	25.7 UJ	59 U	26.5 UJ	42.5	52.5 U	144	22.6 J	59.1	24.9 U	16.8 U
THALLIUM	1.4 U	1.3 U	1.5 U	1.2 U	1.2 UJ	1.4 U	1 UJ	1.2 UJ	1.1 U	1.1 U	1.2 U	0 R	0 R
VANADIUM	18.8 J	8.1	7.9	6.2	16.1 J	12.8	7.6	9.3	16.2 J	4.4 J	18.2 J	4.3	6.4
ZINC	66.1	21.9	24.8	17.7	52.2	34.3	33.2	35.1	117	10 J	80.1	13.6 J	18.6 J
MISCELLANEOUS													
PARAMETERS (UG/KG)													
DIBUTYLTIN	NA	NA	NA	NA	NA	NA	49 UJ	NA	NA	50 U	NA	NA	NA
MONOBUTYLTIN	NA	NA	NA	NA	NA	NA	49 UJ	NA	NA	50 U	NA	NA	
TETRABUTYLTIN	NA	NA	NA	NA	NA	NA	49 UJ	NA	NA	50 U	NA	NA	
TRIBUTYLTIN	NA	NA	NA	NA	NA	NA	49 UJ	NA	NA	50 U	NA	NA	NA
PETROLEUM													
HYDROCARBONS (MG/KG)													
CREOSOTE	NA	NA	NA	NA	NA	NA	180 U	NA	NA	2200	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	NA	NA	NA	NA	NA	NA	4 U	NA	NA	4 U	NA	NA	NA
BARIUM	NA	NA	NA	NA	NA	NA	151 U	NA	NA	133	NA	NA	NA
CADMIUM	NA	NA	NA	NA	NA	NA	3 U	NA	NA	3 U	NA	NA	NA
CHROMIUM	NA	NA	NA	NA	NA	NA	7.8 UJ	NA	NA	6 U	NA	NA	NA
LEAD	NA	NA	NA	NA	NA	NA	1.6 UJ	NA	NA	1.7 UJ	NA	NA	NA
MERCURY	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	0.53 UJ	NA	NA	NA

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# TABLE ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 18 of 27

SAMPLE ID	TP12-	DSY-S- TP20- 0507	TP21-	DSY-S- TP21- 0507	TP22-	TP22-	DSY-S- TP23- 0910	TP23-	TP26-	DSY-S- TP26- 0305	TP26-	DSY-S- TP27- 1011	DSY-S- TP27- 0507
LOCATION ID	_	DSY-TP- 20	DSY-TP- 21	DSY-TP- 21	DSY-TP- 22	DSY-TP- 22	DSY-TP- 23	_	_	DSY-TP- 26	_	DSY-TP- 27	DSY-TP- 27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
SELENIUM	NA	NA	NA	NA	NA	NA	4 U	NA	NA	4.2 UJ	NA	NA	NA
SILVER	NA	NA	NA	NA	NA	NA	6 U	NA	NA	27.5 UJ	NA	NA	NA

### ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 19 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
SAMPLE ID	TP12-	TP28-	TP28-
	1213	1314	0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
VOLATILES (UG/KG)			
1,1,1-TRICHLOROETHANE	NA	NA	NA
1,1,2,2-	NA	NA	NA
TETRACHLOROETHANE			
1,1,2-TRICHLOROETHANE	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA
2-BUTANONE	NA	NA	NA
2-HEXANONE	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA
ACETONE	NA	NA	NA
BENZENE	NA	NA	NA
BROMODICHLOROMETHAN E	NA	NA	NA
BROMOFORM	NA	NA	NA
BROMOMETHANE	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA
CARBON TETRACHLORIDE	NA	NA	NA
CHLOROBENZENE	NA	NA	NA
CHLORODIBROMOMETHAN E	NA	NA	NA
- CHLOROETHANE	NA	NA	NA
CHLOROFORM	NA	NA	NA
CHLOROMETHANE	NA	NA	NA

### ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 20 of 27

	D 0) / 0	D 0) / 0	D 0) / 0
SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
	TP12- 1213	TP28- 1314	TP28- 0507
LOGATION ID			
LOCATION ID	DSY-TP- 12	DSY-TP-	DSY-TP-
0.4451.5.5.4.55	. –	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
CIS-1,3-	NA	NA	NA
DICHLOROPROPENE			
ETHYLBENZENE	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA
STYRENE	NA	NA	NA
TETRACHLOROETHENE	NA	NA	NA
TOLUENE	NA	NA	NA
TOTAL 1,2-	NA	NA	NA
DICHLOROETHENE			
TOTAL XYLENES	NA	NA	NA
TRANS-1,3-	NA	NA	NA
DICHLOROPROPENE			
TRICHLOROETHENE	NA	NA	NA
VINYL CHLORIDE	NA	NA	NA
SEMIVOLATILES (UG/KG)			
1,2,4-TRICHLOROBENZENE	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA
2,2'-OXYBIS(1-	NA	NA	NA
CHLOROPROPANE)			
2,4,5-TRICHLOROPHENOL	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA

### ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 21 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP28-	TP28-
	1213	1314	0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
2,4-DINITROTOLUENE	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA
2-NITROANILINE	NA	NA	NA
2-NITROPHENOL	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA
3-NITROANILINE	NA	NA	NA
4,6-DINITRO-2- METHYLPHENOL	NA	NA	NA
4-BROMOPHENYL PHENYL ETHER	NA	NA	NA
4-CHLORO-3- METHYLPHENOL	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA
4-CHLOROPHENYL PHENYL ETHER	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA
4-NITROANILINE	NA	NA	NA
4-NITROPHENOL	NA	NA	NA
ACENAPHTHENE	NA	NA	NA
ACENAPHTHYLENE	NA	NA	NA
ANTHRACENE	NA	NA	NA

### ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 22 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
SAMI EL ID	TP12-	TP28-	TP28-
	1213	1314	0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
LOCATION ID	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
BENZO(A)ANTHRACENE	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA
BIS(2-	NA	NA	NA
CHLOROETHOXY)METHAN			
E			
BIS(2-	NA	NA	NA
CHLOROETHYL)ETHER			
BIS(2-	NA	NA	NA
ETHYLHEXYL)PHTHALATE			
BUTYL BENZYL	NA	NA	NA
PHTHALATE			
CARBAZOLE	NA	NA	NA
CHRYSENE	NA	NA	NA
DIBENZO(A,H)ANTHRACEN F	NA	NA	NA
DIBENZOFURAN	NA	NA	NA
DIETHYL PHTHALATE			NA NA
	NA	NA	
DIMETHYL PHTHALATE	NA	NA	NA
DI-N-BUTYL PHTHALATE	NA	NA	NA

### ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 23 of 27

0.4.4.D.L.E.LD	D0V 0	D0)/ 0	D0)/ 0
SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
	TP12- 1213	TP28- 1314	TP28-
			0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
044015 0455	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
DI-N-OCTYL PHTHALATE	NA	NA	NA
FLUORANTHENE	NA	NA	NA
FLUORENE	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA
HEXACHLOROCYCLOPENT ADIENE	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA
HIGH MOLECULAR WEIGHT PAHS	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA
ISOPHORONE	NA	NA	NA
LOW MOLECULAR WEIGHT PAHS	NA	NA	NA
NAPHTHALENE	NA	NA	NA
NITROBENZENE	NA	NA	NA
N-NITROSO-DI-N- PROPYLAMINE	NA	NA	NA
N- NITROSODIPHENYLAMINE	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA
PHENANTHRENE	NA	NA	NA
PHENOL	NA	NA	NA
PYRENE	NA	NA	NA

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**TABLE** 

### ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 24 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-		
	TP12-	TP28-	TP28-		
	1213	1314	0507		
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-		
	12	28	28		
SAMPLE DATE	07/26/96	08/21/96	08/21/96		
TOP DEPTH	12 FT	13 FT	5 FT		
BOTTOM DEPTH	13 FT	14 FT	7 FT		
SACODE	NORMAL	NORMAL	NORMAL		
QC TYPE	NM	NM	NM		
TOTAL PAHS	NA	NA	NA		
PESTICIDES/PCBS (UG/KG)					
4,4'-DDD	NA	NA	NA		
4,4'-DDE	NA	NA	NA		
4,4'-DDT	NA	NA	NA		
ALDRIN	NA	NA	NA		
ALPHA-BHC	NA	NA	NA		
ALPHA-CHLORDANE	NA	NA	NA		
AROCLOR-1016	NA	NA	NA		
AROCLOR-1221	NA	NA	NA		
AROCLOR-1232	NA	NA	NA		
AROCLOR-1242	NA	NA	NA		
AROCLOR-1248	NA	NA	NA		
AROCLOR-1254	NA	NA	NA		
AROCLOR-1260	NA	NA	NA		
BETA-BHC	NA	NA	NA		
DELTA-BHC	NA	NA	NA		
DIELDRIN	NA	NA	NA		
ENDOSULFAN I	NA	NA	NA		
ENDOSULFAN II	NA	NA	NA		
ENDOSULFAN SULFATE	NA	NA	NA		
ENDRIN	NA	NA	NA		
ENDRIN ALDEHYDE	NA	NA	NA		
ENDRIN KETONE	NA	NA	NA		

CTO WE20

**TABLE** 

### ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 25 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-		
SAMPLE ID	TP12-	TP28-	TP28-		
	1213	1314	0507		
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-		
	12	28	28		
SAMPLE DATE	07/26/96	08/21/96	08/21/96		
TOP DEPTH	12 FT	13 FT	5 FT		
BOTTOM DEPTH	13 FT	14 FT	7 FT		
SACODE	NORMAL	NORMAL	NORMAL		
QC TYPE	NM	NM	NM		
GAMMA-BHC (LINDANE)	NA	NA	NA		
GAMMA-CHLORDANE	NA	NA	NA		
HEPTACHLOR	NA	NA	NA		
HEPTACHLOR EPOXIDE	NA	NA	NA		
METHOXYCHLOR	NA	NA	NA		
PCB-209	NA	NA	NA		
SUM OF PCB CONGENERS	NA	NA	NA		
X 2					
TOXAPHENE	NA	NA	NA		
METALS (MG/KG)					
ALUMINUM	14300	9240	12800		
ANTIMONY	11.7 UJ	8.3 UJ	10.4 UJ		
ARSENIC	37.3	7.7 J	13.7 J		
BARIUM	11.3	26.2 J	13.7 J		
BERYLLIUM	0.44 J	0.35 J	0.35 J		
CADMIUM	1.3 UJ	0.48 UJ	0.6 UJ		
CALCIUM	1070	744	377		
CHROMIUM	12.6	11.9 J	14.2 J		
COBALT	18.5	10.8 J	14.3 J		
COPPER	26	18.6 J	22.1 J		
IRON	35000	20800	27100		
LEAD	21.2	8 J	15.4 J		
MAGNESIUM	4530	3190	3400		
MANGANESE	514	320 J	302 J		
MERCURY	0.05 U	0.05 U	0.06 U		

**TABLE** 

### ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 26 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-		
OAMI EE ID	TP12-	TP28-	TP28-		
	1213	1314	0507		
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-		
	12	28	28		
SAMPLE DATE	07/26/96	08/21/96	08/21/96		
TOP DEPTH	12 FT	13 FT	5 FT		
BOTTOM DEPTH	13 FT	14 FT	7 FT		
SACODE	NORMAL	NORMAL	NORMAL		
QC TYPE	NM	NM	NM		
NICKEL	30.4	17.9 J	19.1 J		
POTASSIUM	241	661	231		
SELENIUM	0.9 U	0 R	0 R		
SILVER	1.6 J	0.96 UJ	1.2 UJ		
SODIUM	50.4 UJ	26.2 UJ	0 R		
THALLIUM	1.4 U	0 R	0 R		
VANADIUM	18.8 J	13.7	16.4		
ZINC	66.1	42.5 J	44.4 J		
MISCELLANEOUS					
PARAMETERS (UG/KG)					
DIBUTYLTIN	NA	NA	NA		
MONOBUTYLTIN	NA	NA	NA		
TETRABUTYLTIN	NA	NA	NA		
TRIBUTYLTIN	NA	NA	NA		
PETROLEUM					
HYDROCARBONS (MG/KG)					
CREOSOTE	NA	NA	NA		
TCLP METALS (UG/L)					
ARSENIC	NA	NA	NA		
BARIUM	NA	NA	NA		
CADMIUM	NA	NA	NA		
CHROMIUM	NA	NA	NA		
LEAD	NA	NA	NA		
MERCURY	NA	NA	NA		

### ANALYTICAL RESULTS - SUBSURFACE SOIL (SO\_SB\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 27 of 27

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
SAIVIFLE ID			
	TP12-	TP28-	TP28-
	1213	1314	0507
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
SELENIUM	NA	NA	NA
SILVER	NA	NA	NA

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 of 16

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	MW09TP	DSY-S-	DSY-S-	DSY-SB-
	MW02-	MW03-	MW04-	MW05-	MW05-	MW06-	MW07-		MW09-	01	MW11-	MW12-	11-0002
	SS01	0_501	SS01	SS01	SS01-D	SS01	0001	SS01	0001		0001	SS01	
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-SB-
	02	03	04	05	05	06	07	08	09	09	11	12	11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,1,2,2- TETRACHLOROETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,1,2-TRICHLOROETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,1-DICHLOROETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,1-DICHLOROETHENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,2-DICHLOROETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,2-DICHLOROPROPANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
2-BUTANONE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
2-HEXANONE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
4-METHYL-2-PENTANONE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
ACETONE	11 U	11 U	10 U	11 U	12 U	12 U	11 U	28 U	11 U	NA	41 U	11 U	11 U
BENZENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
BROMODICHLOROMETHAN E	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
BROMOFORM	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
BROMOMETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CARBON DISULFIDE	11 U	11 U	10 U	11 UJ	11 UJ	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CARBON TETRACHLORIDE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CHLOROBENZENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CHLORODIBROMOMETHAN E	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CHLOROETHANE	11 U	11 U	10 U	11 UJ	11 UJ	11 UJ	11 U	11 UJ	11 UJ	NA	11 U	11 U	11 UJ
CHLOROFORM	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CHLOROMETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 of 16

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	MW09TP	DSY-S-	DSY-S-	DSY-SB-
	MW02-	MW03-	MW04-	MW05-	MW05-	MW06-	MW07-	MW08-	MW09-	01	MW11-	MW12-	11-0002
	SS01	0_501	SS01	SS01	SS01-D	SS01	0001	SS01	0001		0001	SS01	
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-SB-
	02	03	04	05	05	06	07	08	09	09	11	12	11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
DICHLOROPROPENE													
ETHYLBENZENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
METHYLENE CHLORIDE	11 U	12 U	17 U	23 U	18 U	30 U	15 U	31 U	31 U	NA	18 U	11 U	
STYRENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
TETRACHLOROETHENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
TOLUENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
TOTAL 1,2-	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
DICHLOROETHENE													
TOTAL XYLENES	11 U	11 U	10 U	11 U	11 U	11 U	11 U	3 J	11 U		1 J	11 U	_
TRANS-1,3- DICHLOROPROPENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
TRICHLOROETHENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
VINYL CHLORIDE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
1,2-DICHLOROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
1,3-DICHLOROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
1,4-DICHLOROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2,2'-OXYBIS(1- CHLOROPROPANE)	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2,4,5-TRICHLOROPHENOL	890 U	830 U	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 U	1000 UJ
2,4,6-TRICHLOROPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2,4-DICHLOROPHENOL	350 U	330 U	350 U	330 U		360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2,4-DIMETHYLPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2.4-DINITROPHENOL	890 U	830 UJ	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ		890 U	0 R	

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 of 16

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-		DSY-S-	MW09TP	DSY-S-	DSY-S-	DSY-SB-
	MW02- SS01	MW03- 0_501	MW04- SS01	MW05- SS01	MW05- SS01-D	MW06- SS01	MW07- 0001	MW08- SS01	MW09- 0001	01	MW11- 0001	MW12- SS01	11-0002
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-SB-
	02	03	04	05	05	06	07	08	09	09	11	12	11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2,6-DINITROTOLUENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2-CHLORONAPHTHALENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2-CHLOROPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2-METHYLNAPHTHALENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2-METHYLPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2-NITROANILINE	890 U	830 U	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 U	1000 UJ
2-NITROPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
3,3'-DICHLOROBENZIDINE	350 UJ	330 U	350 U	330 UJ	330 UJ	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
3-NITROANILINE	890 U	830 U	870 U	840 UJ	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 UJ	1000 UJ
4,6-DINITRO-2- METHYLPHENOL	890 U	830 UJ	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	0 R	1000 UJ
4-BROMOPHENYL PHENYL ETHER	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
4-CHLORO-3- METHYLPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
4-CHLOROANILINE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
4-CHLOROPHENYL PHENYL ETHER	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
4-METHYLPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
4-NITROANILINE	890 UJ	830 U	870 U	840 UJ	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 U	1000 UJ
4-NITROPHENOL	890 U	830 U	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 U	1000 UJ
ACENAPHTHENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	52 J	360 UJ	NA	350 U	330 U	410 UJ
ACENAPHTHYLENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
ANTHRACENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	110 J	51 J	NA	350 U	330 U	410 UJ
BENZO(A)ANTHRACENE	350 U	330 U	350 U	330 U	330 U	130 J	400 UJ	200 J	470 J	110 J	350 U	330 U	410 UJ

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# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 of 16

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-		DSY-S-	DSY-S-	DSY-S-	DSY-S-	MW09TP	DSY-S-	DSY-S-	DSY-SB-
	MW02-	MW03-	_	MW05-		MW06-	MW07-	MW08-	MW09-	01	MW11-	MW12-	11-0002
		0_501		SS01	SS01-D	SS01	0001	SS01	0001		0001	SS01	
LOCATION ID	_	_	_	_	_	DSY-MW-	_	_	DSY-MW-	DSY-MW-		DSY-MW-	
	02	03	04	05	05	06	07	08	09	09	11	12	11
SAMPLE DATE	08/08/96	08/05/96				08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT		0.5 FT		0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	_	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	_	_	ORIG	_	NORMAL		_	NORMAL	_	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
BENZO(A)PYRENE	350 U	330 U	350 U	330 U	330 U	120 J	400 UJ	170 J	410 J	100 J	350 U	330 U	410 UJ
BENZO(B)FLUORANTHENE	350 U	330 U	350 U	330 U	330 U	180 J	400 UJ	230 J	660 J	140 J	350 U	330 U	410 UJ
BENZO(G,H,I)PERYLENE	350 U	330 U	350 U	330 U	330 U	72 J	400 UJ	88 J	190 J	48 J	350 U	330 U	410 UJ
BENZO(K)FLUORANTHENE	350 U	330 U	350 U	330 U	330 U	86 J	400 UJ	87 J	270 J	76 J	350 U	330 U	410 UJ
BIS(2-	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
CHLOROETHOXY)METHAN													
E													
BIS(2-	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
CHLOROETHYL)ETHER BIS(2-	46 J	330 U	350 U	330 U	330 U	360 UJ	400 UJ	1200 UJ	360 UJ	3000	350 U	80 J	410 UJ
ETHYLHEXYL)PHTHALATE	40 J	330 0	330 0	330 0	330 0	360 03	400 03	1200 03	360 03	3000	330 0	00 J	410 03
BUTYL BENZYL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
PHTHALATE													
CARBAZOLE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	37 J	360 UJ	NA	350 U	330 U	410 UJ
CHRYSENE	350 U	330 U	350 U	330 U	330 U	140 J	400 UJ	220 J	580 J	120 J	350 U	330 U	410 UJ
DIBENZO(A,H)ANTHRACEN	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	62 J	NA	350 U	330 U	410 UJ
E													
DIBENZOFURAN	350 U	330 U		330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA			
DIETHYL PHTHALATE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
DIMETHYL PHTHALATE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
DI-N-BUTYL PHTHALATE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	51 J	64 J	NA	350 U	330 U	410 UJ
DI-N-OCTYL PHTHALATE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	62 J	360 UJ	NA	350 U	330 U	410 UJ
FLUORANTHENE	350 U	330 U	350 U	330 U	330 U	300 J	400 UJ	460 J	770 J	180 J	350 U	330 U	410 UJ
FLUORENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	50 J	360 UJ	NA	350 U	330 U	410 UJ
HEXACHLOROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
HEXACHLOROBUTADIENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ

#### **TABLE** ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND **PAGE 5 of 16**

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	MW09TP	DSY-S-	DSY-S-	DSY-SB-
	MW02-	MW03-	MW04-	MW05-	MW05-	MW06-	MW07-	MW08-	MW09-	01	MW11-	MW12-	11-0002
	SS01	0_501	SS01	SS01	SS01-D	SS01	0001	SS01	0001		0001	SS01	
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	_	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-SB-
		03	04	05	05	06	07	08	09	09	11	12	11
SAMPLE DATE				08/19/96	08/19/96	08/30/96	08/14/96		08/28/96		07/31/96	08/06/96	09/05/96
TOP DEPTH		0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
HEXACHLOROCYCLOPENT ADIENE	350 U	330 U	350 UJ	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 UJ	410 UJ
HEXACHLOROETHANE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
HIGH MOLECULAR WEIGHT PAHS	350 U	330 U	350 U	330 U	330 U	1329	400 U	1995	4352	982	350 U	330 U	410 U
INDENO(1,2,3-CD)PYRENE	350 U	330 U	350 U	330 U	330 U	71 J	400 UJ	80 J	190 J	48 J	350 U	330 U	410 UJ
ISOPHORONE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
LOW MOLECULAR WEIGHT PAHS	350 U	330 U	350 U	330 U	330 U	120	400 U	632	231	NA	350 U	330 U	410 U
NAPHTHALENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
NITROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
N-NITROSO-DI-N- PROPYLAMINE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
N- NITROSODIPHENYLAMINE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
PENTACHLOROPHENOL	890 U	830 U	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 U	1000 UJ
PHENANTHRENE	350 U	330 U	350 U	330 U	330 U	120 J	400 UJ	420 J	180 J	70 J	350 U	330 U	410 UJ
PHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
PYRENE	350 U	330 U	350 U	330 U	330 U	230 J	400 UJ	460 J	750 J	160 J	350 U	330 U	410 UJ
TOTAL PAHS	350 U	330 U	350 U	330 U	330 U	1449	400 U	2627	4583	1052	350 U	330 U	410 U
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
4,4'-DDE	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
4,4'-DDT	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	5.2 J	NA	3.5 U	3.2 U	4.1 U
ALDRIN	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U

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# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 6 of 16

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	MW09TP	DSY-S-	DSY-S-	DSY-SB-
	MW02-	MW03-	MW04-	MW05-	MW05-	MW06-	MW07-	MW08-	MW09-	01	MW11-	MW12-	11-0002
	SS01	0_501	SS01	SS01	SS01-D	SS01	0001	SS01	0001		0001	SS01	
LOCATION ID	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-MW-	DSY-SB-
	02	03	04	05	05	06	07		09	09	11	12	11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96				01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
ALPHA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
ALPHA-CHLORDANE	1.8 U	2	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
AROCLOR-1016	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	36 UJ	36 UJ	NA	35 U	32 U	41 U
AROCLOR-1221	70 U	67 U	69 U	66 U	66 U	72 UJ	79 UJ	72 UJ	72 UJ	NA	72 U	64 U	83 U
AROCLOR-1232	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	36 UJ	36 UJ	NA	35 U	32 U	41 U
AROCLOR-1242	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	36 UJ	36 UJ	NA	35 U	32 U	41 U
AROCLOR-1248	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	36 UJ	36 UJ	NA	35 U	32 U	41 U
AROCLOR-1254	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	38 J	36 UJ	NA	35 U	32 U	41 U
AROCLOR-1260	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	36 UJ	36 UJ	NA	35 U	32 U	41 U
BETA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
DELTA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
DIELDRIN	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
ENDOSULFAN I	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
ENDOSULFAN II	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
ENDOSULFAN SULFATE	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
ENDRIN	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	5.7
ENDRIN ALDEHYDE	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
ENDRIN KETONE	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
GAMMA-BHC (LINDANE)	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
GAMMA-CHLORDANE	1.8 U	2.4	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
HEPTACHLOR	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
HEPTACHLOR EPOXIDE	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
METHOXYCHLOR	18 U	17 U	18 U	17 U	17 U	19 UJ	20 UJ	19 UJ	18 UJ	NA	18 U	17 U	21 U
PCB-209	3.5 U	3.3 UJ	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 7 of 16

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	MW09TP	DSY-S-	DSY-S-	DSY-SB-
	MW02-	MW03-	_							01	MW11-	MW12-	11-0002
		0_501	SS01	SS01		SS01	0001	SS01	0001		0001	SS01	
LOCATION ID	DSY-MW-		_	DSY-MW-		_		_			DSY-MW-	DSY-MW-	
0.140 5 0.175	02	03	04	05	05	06	07	08	09	09	11	12	11
SAMPLE DATE	08/08/96		08/12/96	08/19/96		08/30/96	08/14/96		08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT			0.5 FT			0 FT		0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	_	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL		-	ORIG				_	NORMAL	NORMAL			NORMAL
QC TYPE	NM		NM	NM		NM		1 1111	NM	NM	NM	NM	NM
SUM OF PCB CONGENERS X 2	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U			3.6 U	3.6 U	NA	3.5 U	3.2 U	4.1 U
TOXAPHENE	180 U	170 U	180 U	170 U	170 U	190 UJ	200 UJ	190 UJ	180 UJ	NA	180 U	170 U	210 U
METALS (MG/KG)													
ALUMINUM	4620	4460 J	3440	8060	8300	12300	13100	10100	5260	NA	4220 J	4690	4300
ANTIMONY	9.7 UJ	10.2 U	10.2 UJ	9.4 UJ	8.4 UJ	10.6 UJ	10.6 UJ	9.8 UJ	10.6 UJ	NA	11.1 U	10 UJ	10.7 UJ
ARSENIC	3	3.3	4.9	5.8	4.9	10.4	23.9	19.2	5.3	13	3.8	2.8	2.9 U
BARIUM	5.4	5.9	6.4	12.5	12.4	14.8 J	12.1	67	12.9	180	9.3	4.1 U	7.2
BERYLLIUM	0.19 U	0.2 U	0.2 U	0.26 J	0.26 J	0.45	0.38 J	3.5	0.2 U	NA	0.21 U	0.19 U	0.21 U
CADMIUM	0.56 U	0.59 U	0.59 U	0.54 U	0.48 U	0.61 U	0.61 U	0.57 U	0.61 U	13	0.64 U	0.58 U	0.62 UJ
CALCIUM	412	735	325	762 J	662 J	1180	1130 J	2790	626	NA	91.1 U	533	407 J
CHROMIUM	7.8	8.8	6.9 UJ	10	9.6	15.8 J	15.8	40.2 J	13.7 J	130	6.5 U	7.4	6.7
COBALT	4.4	3.5 U	4.6	9.3	8.6	22.7	14.7	23.9	7	NA	8	2.6	4.6 U
COPPER	8.9	13.6 J	9.2	15.2	15.1	30.2	19.5	262	25.5	NA	15.7 J	3.1	8
IRON	12800	13100 J	12100	18000	19000	30600	31000	32900	16900	NA	11900 J	11500	12900
LEAD	3.7 J	20.1	7 J	5.8 J	21.2 J	18.1 J	9.2 J	189 J	23.4 J	63	4.8	2.3 J	8 J
MAGNESIUM	1850	1710	1350	2920	3010	4090	3860	2830	2150	NA	1320	1820	1700
MANGANESE	137 J	111	149	323	272	619	448	489	307	NA	268	81.4 J	135 J
MERCURY	0.05 U	0.06	0.04 U	0.05 U	0.05 U	0.05 U	0.12	0.07	0.05 U	NA	0.05 U	0.05 U	0.05 U
NICKEL	13.1 J	9.7 J	8.2	14.5	15.3	24.9	24.9	113	17.8	NA	9.4 J	9.8 J	11 U
POTASSIUM	252	265	209	341	391	282	241	381	261	NA	225	241	250
SELENIUM	0.78 J	0.78 U	0.79 UJ	0.72 U	0.65 U	0.82 U	0.82 U	0.75 U	0.81 U	3	0.85 U	1 J	0.83 UJ
SILVER	1.1 UJ	1.2 UJ	1.2 UJ	1.1 UJ	0.97 UJ	1.2 UJ	1.2 UJ	1.1 UJ	1.2 UJ	NA	1.3 UJ	1.2 UJ	1.2 UJ
SODIUM	18.7 U	39.2 U	16.5 UJ	51.3 U	52.1 U	0 R	22.6 UJ	163 J	20.5 U	NA	24.6 U	31.4 U	35.6 U
THALLIUM	1.1 UJ	1.2 UJ	1.2 U	1.1 UJ	0.97 UJ	1.2 UJ	1.2 UJ	1.1 UJ	1.2 UJ	NA	1.3 UJ	1.2 UJ	1.2 UJ

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 8 of 16

	MW02- SS01	MW03- 0_501	MW04- SS01	MW05- SS01	MW05- SS01-D	DSY-S- MW06- SS01	MW07- 0001	MW08- SS01	MW09- 0001	MW09TP 01	MW11- 0001	DSY-S- MW12- SS01	DSY-SB- 11-0002
LOCATION ID	DSY-MW- 02	DSY-MW- 03	DSY-MW- 04	05	05	DSY-MW- 06	DSY-MW- 07	08	09	DSY-MW- 09	11	DSY-MW- 12	DSY-SB- 11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT		1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VANADIUM	7.4	7.7	6.6	8.6	8.9	14.5	14.5	13.1	16.7	NA	6.4	7.4	8.4
ZINC	28.8	49.2	22.8	32.7 J	34 J	88.5 J	54.8 J	831 J	175 J	NA	22.8	22.8	26.4
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	50 U	50 U	49 U	50 U	49 U	50 U	50 UJ	49 UJ	NA	50 UJ	50 U	50 UJ
MONOBUTYLTIN	50 U	50 U	50 U	49 U	50 U	49 U	50 U	50 UJ	49 UJ	NA	50 UJ	50 U	50 UJ
TETRABUTYLTIN	50 U	50 U	50 U	49 U	50 U	49 U	50 U	50 UJ	49 UJ	NA	50 UJ	50 U	50 UJ
TRIBUTYLTIN	50 U	50 U	50 U	49 U	50 U	49 U	50 U	6.9 J	49 UJ	NA	50 UJ	50 U	50 UJ
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	77 UJ	81 U	61 U	58 U	65 U	72	70 U	270	77	NA	77 UJ	83 U	84 U
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA	NA	55	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	4 U	4 U	4 U	4.6 J	4 U	5.7 J	6.3 UJ	4 U	NA	4 U	4 U	4.4 J
BARIUM	609	125 U	278	683 U	634 U	121 U	724 U	272 U	129 U	NA	112 U	592	150 U
CADMIUM	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 J	3 U	NA	3 U	3 U	3 U
CHROMIUM	6 U	6 U	6 U	6 U	6 U	13.6	6 U	8.7 J	6 U	NA	6 U	6 U	40.5 J
LEAD	1 U	1 U	5.7	1 U	1 U	6.2 UJ	1.8 UJ	81.3 J	16.4 J	NA	1 U	1.1 UJ	4.5 U
MERCURY	0.1 UJ	0.1 U	0.1 U		0.1 U	0.1 U			0.1 U		0.1 U	0.1 UJ	
SELENIUM	4 U		4 U	_			4 U	_	4 U		4 U	4 U	
SILVER	6 U	6 UJ	6 U	6.1 UJ	7.5 UJ	7.6 UJ	6 U	6 U	6 U	NA	6.2 UJ	6 U	18.6 UJ

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 9 of 16

SAMPLE ID	DSY-S- MW02- SS01	DSY-S- TP07- 0001	DSY-S- TP08- 0001	DSY-S- TP08- 0001-D	DSY-S- TP09- 0001	DSY-S- TP10- 0001	DSY-S- TP11- 0001	B6-S1
LOCATION ID	DSY-MW- 02	DSY-TP- 07	DSY-TP- 08	DSY-TP- 08	DSY-TP- 09	DSY-TP- 10	DSY-TP- 11	DSY-TP- 14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)								
1,1,1-TRICHLOROETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,1,2,2- TETRACHLOROETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,1,2-TRICHLOROETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,1-DICHLOROETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,1-DICHLOROETHENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,2-DICHLOROETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,2-DICHLOROPROPANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
2-BUTANONE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
2-HEXANONE	11 U	11 U	11 U	10 U	11 UJ	10 U	11 U	NA
4-METHYL-2-PENTANONE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
ACETONE	11 U	26 U	19 U	20 U	11 U	10 U	11 U	NA
BENZENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
BROMODICHLOROMETHAN E	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
BROMOFORM	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
BROMOMETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CARBON DISULFIDE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CARBON TETRACHLORIDE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CHLOROBENZENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CHLORODIBROMOMETHAN E	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CHLOROETHANE	11 U	11 UJ	11 UJ	10 UJ	11 U	10 U	11 U	NA
CHLOROFORM	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CHLOROMETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA

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# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 10 of 16

SAMPLE ID	DSY-S- MW02- SS01	DSY-S- TP07- 0001	DSY-S- TP08- 0001	DSY-S- TP08- 0001-D	DSY-S- TP09- 0001	DSY-S- TP10- 0001	DSY-S- TP11- 0001	B6-S1
LOCATION ID	DSY-MW- 02	DSY-TP- 07	DSY-TP- 08	DSY-TP- 08	DSY-TP- 09	DSY-TP- 10	DSY-TP- 11	DSY-TP- 14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3- DICHLOROPROPENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
ETHYLBENZENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
METHYLENE CHLORIDE	11 U	11 U	11 U	11 U	11 U	10 U	11 U	NA
STYRENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
TETRACHLOROETHENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
TOLUENE	11 U	1 J	2 J	1 J	11 U	10 U	11 U	NA
TOTAL 1,2- DICHLOROETHENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
TOTAL XYLENES	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
TRANS-1,3- DICHLOROPROPENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
TRICHLOROETHENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
VINYL CHLORIDE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
SEMIVOLATILES (UG/KG)								
1,2,4-TRICHLOROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
1,2-DICHLOROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
1,3-DICHLOROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
1,4-DICHLOROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,2'-OXYBIS(1- CHLOROPROPANE)	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,4,5-TRICHLOROPHENOL	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA
2,4,6-TRICHLOROPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,4-DICHLOROPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,4-DIMETHYLPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,4-DINITROPHENOL	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 11 of 16

SAMPLE ID	DSY-S- MW02- SS01	DSY-S- TP07- 0001	DSY-S- TP08- 0001	DSY-S- TP08- 0001-D	DSY-S- TP09- 0001	DSY-S- TP10- 0001	DSY-S- TP11- 0001	B6-S1
LOCATION ID	DSY-MW- 02	DSY-TP- 07	DSY-TP- 08	DSY-TP- 08	DSY-TP- 09	DSY-TP- 10	DSY-TP- 11	DSY-TP- 14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,6-DINITROTOLUENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2-CHLORONAPHTHALENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2-CHLOROPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2-METHYLNAPHTHALENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2-METHYLPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2-NITROANILINE	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA
2-NITROPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
3,3'-DICHLOROBENZIDINE	350 UJ	1700 U	350 UJ	340 UJ	710 U	360 UJ	350 U	NA
3-NITROANILINE	890 U	4200 U	870 UJ	850 U	1800 U	900 UJ	870 U	NA
4,6-DINITRO-2- METHYLPHENOL	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA
4-BROMOPHENYL PHENYL ETHER	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
4-CHLORO-3- METHYLPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
4-CHLOROANILINE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
4-CHLOROPHENYL PHENYL ETHER	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
4-METHYLPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
4-NITROANILINE	890 UJ	4200 U	870 U	850 UJ	1800 U	900 U	870 U	NA
4-NITROPHENOL	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA
ACENAPHTHENE	350 U	1700 U	350 U	340 U	710 U	46 J	350 U	NA
ACENAPHTHYLENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
ANTHRACENE	350 U	1700 U	350 U	340 U	710 U	65 J	350 U	NA
BENZO(A)ANTHRACENE	350 U	170 J	350 U	340 U	710 U	250 J	350 U	42 J

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 12 of 16

SAMPLE ID	DSY-S- MW02- SS01	DSY-S- TP07- 0001	DSY-S- TP08- 0001	DSY-S- TP08- 0001-D	DSY-S- TP09- 0001	DSY-S- TP10- 0001	DSY-S- TP11- 0001	B6-S1
LOCATION ID	DSY-MW- 02	DSY-TP- 07	DSY-TP- 08	DSY-TP- 08	DSY-TP- 09	DSY-TP- 10	DSY-TP- 11	DSY-TP- 14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
BENZO(A)PYRENE	350 U	200 J	350 U	340 U	710 U	210 J	350 U	NA
BENZO(B)FLUORANTHENE	350 U	410 J	36 J	77 J	710 U	340 J	350 U	50 J
BENZO(G,H,I)PERYLENE	350 U	1700 U	350 U	340 U	710 U	160 J	350 U	NA
BENZO(K)FLUORANTHENE	350 U	1700 U	350 U	340 U	710 U	140 J	350 U	NA
BIS(2- CHLOROETHOXY)METHAN E	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
BIS(2- CHLOROETHYL)ETHER	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
BIS(2- ETHYLHEXYL)PHTHALATE	46 J	8700	1600 U	380 U	2700 U	930 U	350 U	NA
BUTYL BENZYL PHTHALATE	350 U	1700 U				360 U	350 U	NA
CARBAZOLE	350 U	1700 U		340 U	710 U	56 J		NA
CHRYSENE	350 U	310 J	350 U	_		290 J		
DIBENZO(A,H)ANTHRACEN E	350 U	1700 U	350 U		710 U	360 U	350 U	NA
DIBENZOFURAN	350 U	1700 U		340 U	710 U	360 U		NA
DIETHYL PHTHALATE	350 U	1700 U	350 U		710 U	360 U		NA
DIMETHYL PHTHALATE	350 U	1700 U	350 U		710 U	360 U		NA
DI-N-BUTYL PHTHALATE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
DI-N-OCTYL PHTHALATE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
FLUORANTHENE	350 U	1700 U	50 J			470	350 U	82 J
FLUORENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
HEXACHLOROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
HEXACHLOROBUTADIENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 13 of 16

CAMPI E ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DC C1
SAMPLE ID	MW02-	DSY-S- TP07-	TP08-	DSY-S- TP08-	TP09-	DSY-S- TP10-	DSY-5- TP11-	B6-S1
	SS01	0001	0001	0001-D	0001	0001	0001	
LOCATION ID		DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
LOCATION ID	02	07	08	08	09	10	11	14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	07723730 0 FT	07723730 0 FT	07723730 0 FT	07723730 0 FT	07720700 0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.25 T T
	_	NORMAL						
SACODE			ORIG	DUP	NORMAL		NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
HEXACHLOROCYCLOPENT ADIENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 UJ	NA
HEXACHLOROETHANE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
HIGH MOLECULAR WEIGHT PAHS	350 U	1410	158	290	710 U	2570	350 U	277
INDENO(1,2,3-CD)PYRENE	350 U	1700 U	350 U	340 U	710 U	150 J	350 U	NA
ISOPHORONE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
LOW MOLECULAR WEIGHT	350 U	1700 U	36	47	710 U	461	350 U	NA
PAHS								
NAPHTHALENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
NITROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
N-NITROSO-DI-N- PROPYLAMINE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
N-	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
NITROSODIPHENYLAMINE								
PENTACHLOROPHENOL	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA
PHENANTHRENE	350 U	1700 U	36 J	47 J	710 U	350 J	350 U	60 J
PHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
PYRENE	350 U	320 J	72 J	72 J	710 U	560	350 U	58 J
TOTAL PAHS	350 U	1410	194	337	710 U	3031	350 U	337
PESTICIDES/PCBS (UG/KG)								
4,4'-DDD	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
4,4'-DDE	3.5 U	3.4 U	3.4 UJ	4.5 J	3.6 UJ	3.5 U	3.4 UJ	NA
4,4'-DDT	3.5 U	3.4 U	8.9	8.3	3.6 UJ	5	3.4 UJ	NA
ALDRIN	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA

TABLE

ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS)

FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 14 of 16

SAMPLE ID	DSY-S- MW02- SS01	DSY-S- TP07- 0001	DSY-S- TP08- 0001	DSY-S- TP08- 0001-D	DSY-S- TP09- 0001	DSY-S- TP10- 0001	DSY-S- TP11- 0001	B6-S1
LOCATION ID								DOV TD
LOCATION ID	DSY-MW- 02	DSY-TP- 07	DSY-TP- 08	DSY-TP- 08	DSY-TP- 09	DSY-TP- 10	DSY-TP- 11	DSY-TP- 14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	01/29/90 0 FT	01/29/90 0 FT	07729/90 0 FT	07729/90 0 FT	07729790 0 FT	07/20/90 0 FT	0.25 FT
			-		-	1 FT	_	
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT		1 FT	0.5 FT
SACODE	_	NORMAL	ORIG	DUP	NORMAL	NORMAL	_	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
ALPHA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U		
ALPHA-CHLORDANE	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
AROCLOR-1016	35 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1221	70 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1232	35 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1242	35 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1248	35 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1254	35 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1260	35 U	34 U	34 U	34 U	36 UJ	24 J	34 UJ	NA
BETA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
DELTA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
DIELDRIN	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
ENDOSULFAN I	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
ENDOSULFAN II	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
ENDOSULFAN SULFATE	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
ENDRIN	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
ENDRIN ALDEHYDE	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
ENDRIN KETONE	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
GAMMA-BHC (LINDANE)	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
GAMMA-CHLORDANE	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	3.9	1.8 UJ	NA
HEPTACHLOR	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	4.5	1.8 UJ	NA
HEPTACHLOR EPOXIDE	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
METHOXYCHLOR	18 U	17 U	18 U	17 U	18 UJ	18 U	18 UJ	NA
PCB-209	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 15 of 16

SAMPLE ID	DSY-S- MW02- SS01	DSY-S- TP07- 0001	DSY-S- TP08- 0001	DSY-S- TP08- 0001-D	DSY-S- TP09- 0001	DSY-S- TP10- 0001	DSY-S- TP11- 0001	B6-S1
LOCATION ID		DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
LOGATION ID	02	07	08	08	09	10	11	14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
SUM OF PCB CONGENERS X 2	3.5 U	3.4 U	3.4 U	3.4 U	3.6 U	3.5 U	3.4 U	NA
TOXAPHENE	180 U	170 U	180 U	170 U	180 UJ	180 U	180 UJ	NA
METALS (MG/KG)								
ALUMINUM	4620	4930	5910	6340	11300	10000	12100	NA
ANTIMONY	9.7 UJ	8.2 UJ	8.9 UJ	9.1 UJ	9.9 UJ	9.6 UJ	8 UJ	NA
ARSENIC	3	3.9	4.9	7.4	23.6	15.8	24.4	13
BARIUM	5.4	8.9	46.8	42	18	28.1	17.1	19
BERYLLIUM	0.19 U	0.18 J	0.21 J	0.24 J	0.44	0.54	0.41 J	NA
CADMIUM	0.56 U	0.47 U	0.52 U	0.53 U	0.57 U	0.55 U	0.97 J	1.4
CALCIUM	412	521	632	677	571	1030	742	NA
CHROMIUM	7.8	12.3	15	16	16	18.4	15.6	10
COBALT	4.4	5.4	7.9	8.6	21.4	13.5	14.4 J	NA
COPPER	8.9	16.8	26.7	26.9	26.4	35	25.6	NA
IRON	12800	14500	19500	21100	37200	26700	31800	NA
LEAD	3.7 J	17.2 J	52.8 J	50.2 J	12.8 J	62.5 J	10.3	18
MAGNESIUM	1850	1800	2080	2190	3380	2850	3360	NA
MANGANESE	137 J	195	291	310	597	448	445 J	NA
MERCURY	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.09 U	NA
NICKEL	13.1 J	12.6 J	16.3 J	18.2 J	28.2	26.7	23.7	NA
POTASSIUM	252	227	319		331	374	341	NA
SELENIUM	0.78 J	0.63 U	0.69 U	0.7 U	0.76 U	0.74 U	0.87 J	NA
SILVER	1.1 UJ	0.95 UJ			1.1 UJ	1.1 UJ		NA
SODIUM	18.7 U	24.8	33.5 J	27.8 J	19 J	75.9 J	61.5 U	NA
THALLIUM	1.1 UJ	0.95 U	1 U	1.1 U	1.1 U	1.1 U	0.92 UJ	NA

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 16 of 16

SAMPLE ID	DSY-S- MW02- SS01	DSY-S- TP07- 0001	DSY-S- TP08- 0001	DSY-S- TP08- 0001-D	DSY-S- TP09- 0001	DSY-S- TP10- 0001	DSY-S- TP11- 0001	B6-S1
LOCATION ID	DSY-MW- 02	DSY-TP- 07	DSY-TP- 08	DSY-TP- 08	DSY-TP- 09	DSY-TP- 10	DSY-TP- 11	DSY-TP- 14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
VANADIUM	7.4	10.1 J	12.2 J	13.9 J	20 J	23.2 J	17.8 J	NA
ZINC	28.8	63.6	131	126	75.3	139	51.2	NA
MISCELLANEOUS PARAMETERS (UG/KG)								
DIBUTYLTIN	50 U	50 U	49 U	50 U	50 U	50 U	50 U	NA
MONOBUTYLTIN	50 U	50 U	49 U	50 U	50 UJ	50 U	50 U	NA
TETRABUTYLTIN	50 U	50 U	49 U	50 U	11.4 J	50 U	50 U	NA
TRIBUTYLTIN	50 U	50 U	49 U	50 U	2.1 J	50 U	50 U	NA
PETROLEUM HYDROCARBONS (MG/KG)								
CREOSOTE	77 UJ	51 U	51 U	52 U	53 U	61	49 U	NA
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)								
ARSENIC	4 U	4 U	4 U	4 U	4 U	4 U	4 U	NA
BARIUM	609	90.7	350	456	128	152	87.1 U	NA
CADMIUM	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA
CHROMIUM	6 U	6 U	39.5 J	52.4 J	6 U	6 U	6 U	NA
LEAD	1 U	9.6	90.5	114	2.5 U	41.6	1 U	NA
MERCURY	0.1 UJ	0.53 UJ	0.55 UJ	0.56 UJ	0.55 UJ	0.59 UJ	0.1 UJ	NA
SELENIUM	4 U	5.5 U	5.9 U	5.8 U	4.9 UJ	5 U	4 U	NA
SILVER	6 U	6 U	6 U	6 U	6 U	14.4 UJ	0 R	NA

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 1 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP15-	TP16-	TP17-	TP18-	TP18-	TP19-	TP20-	TP21-	TP22-	TP23-	TP26-	TP27-
	0001	0001	0001	0001	0001	0001-D	0001	0001	0001	0001	0001	0001	0001
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	15	16	17	18	18	19	20	21	22	23	26	27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT				
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1,2,2-	11 U	11 U	12 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
TETRACHLOROETHANE													
1,1,2-TRICHLOROETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1-DICHLOROETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1-DICHLOROETHENE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,2-DICHLOROETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,2-DICHLOROPROPANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
2-BUTANONE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
2-HEXANONE	11 U	11 U	12 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
4-METHYL-2-PENTANONE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
ACETONE	11 U	11 U	11 U	11 U	110	120	100	77	110	75	92 J	11 U	11 U
BENZENE	11 U	11 U	1 J	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
BROMODICHLOROMETHAN E	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
BROMOFORM	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
BROMOMETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CARBON DISULFIDE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CARBON TETRACHLORIDE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CHLOROBENZENE	11 U	11 U	3 J	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CHLORODIBROMOMETHAN E	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CHLOROETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CHLOROFORM	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CHLOROMETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 2 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
J == 12	TP12-	TP15-	TP16-	TP17-	TP18-	TP18-	TP19-	TP20-	TP21-	TP22-	TP23-	TP26-	TP27-
	0001	0001	0001	0001	0001	0001-D	0001	0001	0001	0001	0001	0001	0001
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	15	16	17	18	18	19	20	21	22	23	26	27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT				
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
DICHLOROPROPENE													
ETHYLBENZENE	11 U	11 U	12 UJ	11 U					11 U	_	_		_
METHYLENE CHLORIDE	11 U	11 U	18 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	_
STYRENE	11 U	11 U	12 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
TETRACHLOROETHENE	11 U	11 U	12 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
TOLUENE	11 U	11 U	2 J	11 U	11 U	1 J	1 J	2 J	1 J	11 U	4 J	11 U	11 U
TOTAL 1,2-	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
DICHLOROETHENE													
TOTAL XYLENES	11 U	11 U	12 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 U		11 U	_
TRANS-1,3- DICHLOROPROPENE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
TRICHLOROETHENE	11 U	11 U	2 J	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
VINYL CHLORIDE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
1,2-DICHLOROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
1,3-DICHLOROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
1,4-DICHLOROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2,2'-OXYBIS(1- CHLOROPROPANE)	350 U	180 J	12000 U	350 UJ	380 U	39 J	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2.4.5-TRICHLOROPHENOL	880 U	930 UJ	29000 U	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 UJ	870 U
2.4.6-TRICHLOROPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U			370 U		370 U	350 UJ	
2.4-DICHLOROPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U			370 U			350 UJ	
2.4-DIMETHYLPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U		380 U	370 U		370 U	350 UJ	
2.4-DINITROPHENOL	880 UJ	930 UJ	29000 U	880 UJ	950 U	950 U		960 U	930 U		930 U	890 UJ	
Z,T-DINITINOL HENOL	000 00	930 03	29000 0	000 00	930 0	930 0	930 0	900 0	930 0	910 0	930 0	090 00	370 0

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 3 of 18

SAMPLE ID			DSY-S-		DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
		TP15-	TP16-	TP17-	TP18-	TP18-	TP19-	TP20-	TP21-	TP22-	TP23-	TP26-	TP27-
	0001	0001	0001	0001	0001	0001-D	0001	0001	0001	0001	0001	0001	0001
LOCATION ID	_	DSY-TP-	DSY-TP-	_	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	15	16	17	18	18	19	20	21	22	23	26	27
SAMPLE DATE	07/26/96	07/25/96	07/25/96		07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT     1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT					
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 L	350 U.	350 U
2,6-DINITROTOLUENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 L	350 U.	350 U
2-CHLORONAPHTHALENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 L	350 U.	350 U
2-CHLOROPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U.	350 U
2-METHYLNAPHTHALENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 L	350 U.	350 U
2-METHYLPHENOL	350 U	370 UJ	12000 U	83 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U.	350 U
2-NITROANILINE	880 U	930 UJ	29000 U	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 U.	870 U
2-NITROPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 L	350 U.	350 U
3,3'-DICHLOROBENZIDINE	350 U	370 UJ	12000 UJ	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U.	350 U
3-NITROANILINE	880 U	930 UJ	29000 UJ	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 U.	870 U
4,6-DINITRO-2- METHYLPHENOL	880 U	930 UJ	29000 U	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 U.	870 U
4-BROMOPHENYL PHENYL ETHER	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U.	350 U
4-CHLORO-3- METHYLPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U.	350 U
4-CHLOROANILINE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 L	350 U.	350 U
4-CHLOROPHENYL PHENYL ETHER	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U.	350 U
4-METHYLPHENOL	350 U	370 UJ	12000 U	500 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
4-NITROANILINE	880 U	930 UJ	29000 UJ	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 U.	870 U
4-NITROPHENOL	880 UJ	930 UJ	29000 U	880 UJ	950 U	950 U	950 UJ	960 UJ	930 UJ	910 UJ	930 UJ	J 890 U.	870 U
ACENAPHTHENE	350 U	92 J	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 L	350 U.	350 U
ACENAPHTHYLENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U		370 U	360 U		350 U.	350 U

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 4 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP15-	TP16-	TP17-	TP18-	TP18-	TP19-	TP20-	TP21-	TP22-	TP23-	TP26-	TP27-
	0001	0001	0001	0001	0001	0001-D	0001	0001	0001	0001	0001	0001	0001
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	15	16	17	18	18	19	20	21	22	23	26	27
SAMPLE DATE			07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	_	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
ANTHRACENE	350 U	130 J	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
BENZO(A)ANTHRACENE	350 U	410 J	12000 U	140 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	60 J	350 U
BENZO(A)PYRENE	350 U	86 J	12000 U	140 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	50 J	350 U
BENZO(B)FLUORANTHENE	350 U	410 J	12000 U	230 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	66 J	350 U
BENZO(G,H,I)PERYLENE	350 U	110 J	12000 U	130 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U	350 U
BENZO(K)FLUORANTHENE	350 U	360 J	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U	350 U
BIS(2-	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
CHLOROETHOXY)METHAN E													
BIS(2- CHLOROETHYL)ETHER	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
BIS(2- ETHYLHEXYL)PHTHALATE	350 U	370 UJ	12000 U	350 UJ	150 J	65 J	66 J	44 J	68 J	65 J	110 J	350 UJ	350 U
BUTYL BENZYL PHTHALATE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
CARBAZOLE	350 U	97 J	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
CHRYSENE	350 U	420 J	12000 U	120 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	46 J	350 U
DIBENZO(A,H)ANTHRACEN E	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U	350 U
DIBENZOFURAN	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
DIETHYL PHTHALATE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
DIMETHYL PHTHALATE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
DI-N-BUTYL PHTHALATE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
DI-N-OCTYL PHTHALATE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U	350 U
FLUORANTHENE	350 U	870 J	12000 U	330 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	140 J	350 U
FLUORENE	350 U	65 J	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 5 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP15-	TP16-	TP17-	TP18-	TP18-	TP19-	TP20-	TP21-	TP22-	TP23-	TP26-	TP27-
	0001	0001	0001	0001	0001	0001-D	0001	0001	0001	0001	0001	0001	0001
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
	12	15	16	17	18	18	19	20	21	22	23	26	27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT				
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
HEXACHLOROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
HEXACHLOROBUTADIENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
HEXACHLOROCYCLOPENT ADIENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
HEXACHLOROETHANE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	55 J	370 U	360 U	370 U	350 UJ	350 U
HIGH MOLECULAR WEIGHT PAHS	350 U	3556	1400	1530	380 U	380 U	380 U	380 U	370 U	360 U	370 U	472	350 U
INDENO(1,2,3-CD)PYRENE	350 U	150 J	12000 U	140 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U	350 U
ISOPHORONE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
LOW MOLECULAR WEIGHT PAHS	350 U	867	12000 U	130	380 U	380 U	380 U	380 U	370 U	360 U	370 U	82	350 U
NAPHTHALENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
NITROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
N-NITROSO-DI-N- PROPYLAMINE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
N- NITROSODIPHENYLAMINE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
PENTACHLOROPHENOL	880 U	930 UJ	29000 U	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 UJ	870 U
PHENANTHRENE	350 U	580 J	12000 U	130 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	82 J	350 U
PHENOL	350 U	370 UJ	12000 U	1200 J	170 J	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
PYRENE	350 U	740 J	1400 J	300 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	110 J	350 U
TOTAL PAHS	350 U	4423	1400	1660	380 U	380 U	380 U	380 U	370 U	360 U	370 U	554	350 U
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	3.5 U	4.3	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
4,4'-DDE	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 6 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
	TP12-			TP17-	TP18-	TP18-	TP19-	TP20-	TP21-	TP22-	TP23-	TP26-	TP27-
	0001	0001		0001	0001	0001-D	0001	0001	0001	0001	0001	0001	0001
LOCATION ID		DSY-TP-	DSY-TP-		DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-	DSY-TP-
SAMPLE DATE	12 07/26/96	15 07/25/96	16 07/25/96	17 07/25/96	18 07/24/96	18 07/24/96	19 07/24/96	20 07/24/96	21 07/24/96	22 07/24/96	23 07/23/96	26 07/26/96	27 08/22/96
TOP DEPTH	07/26/96 0 FT				07724/96 0 FT		07/24/96 0 FT	07724/96 0 FT	07/24/96 0 FT	07/24/96 0 FT	07/23/96 0 FT	07720/96 0 FT	06/22/96 0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE				NORMAL	ORIG			NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
					NM	_	NM	NM	NM	NM	NM	NM	NM
QC TYPE													
4,4'-DDT	3.5 U		3.9 U	3.5 U		3.5 UJ	3.3 U		3.5 U	3.4 U			
ALDRIN	1.8 U	1.9 U	2 U	1.8 U		1.8 UJ	1.7 U		1.8 U	1.7 U			
ALPHA-BHC	1.8 U	1.9 U	2 U	1.8 U		1.8 UJ	1.7 U			1.7 U			1.8 U
ALPHA-CHLORDANE	1.8 U	1.9 U	2 U	1.8 U		1.8 UJ	1.7 U	_	1.8 U	1.7 U		1.8 U	1.8 U
AROCLOR-1016	35 U		39 U	35 U		35 UJ	33 U		35 U	34 U			34 U
AROCLOR-1221	35 U	37 U	39 U	35 U		35 UJ	33 U		35 U	34 U		35 U	69 U
AROCLOR-1232	35 U	37 U	39 U	35 U	34 U	35 UJ	33 U		35 U	34 U		35 U	34 U
AROCLOR-1242	35 U	37 U	39 U	35 U	34 U	35 UJ	33 U	34 U	35 U	34 U	35 U	35 U	34 U
AROCLOR-1248	35 U	37 U	39 U	35 U	34 U	35 UJ	33 U	34 U	35 U	34 U	35 U	35 U	34 U
AROCLOR-1254	35 U	37 U	39 U	35 U	34 U	35 UJ	33 U	34 U	35 U	34 U	35 U	35 U	34 U
AROCLOR-1260	35 U	32 J	24 J	35 U	34 U	35 UJ	33 U	34 U	35 U	34 U	35 U	35 U	34 U
BETA-BHC	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
DELTA-BHC	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
DIELDRIN	3.5 U	3.7 U	16	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
ENDOSULFAN I	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
ENDOSULFAN II	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
ENDOSULFAN SULFATE	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
ENDRIN	3.5 U	3.7 U	26	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
ENDRIN ALDEHYDE	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
ENDRIN KETONE	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
GAMMA-BHC (LINDANE)	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
GAMMA-CHLORDANE	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
HEPTACHLOR	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
HEPTACHLOR EPOXIDE	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
METHOXYCHLOR	18 U	19 U	20 U	18 U	18 U	18 UJ	17 U	17 U	18 U	17 U	18 U	18 U	18 U

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 7 of 18

SAMPLE ID					DSY-S-			DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-	DSY-S-
				TP17-	TP18-		TP19-	TP20-	TP21-	TP22-	TP23-	TP26-	TP27-
LOCATION ID		0001		0001	0001	0001-D	0001	0001	0001	0001	0001	0001	0001
LOCATION ID	DSY-TP- 12	DSY-TP- 15	DSY-TP- 16	DSY-TP- 17	DSY-TP- 18	DSY-TP- 18	DSY-TP- 19	DSY-TP- 20	DSY-TP- 21	DSY-TP- 22	DSY-TP- 23	DSY-TP- 26	DSY-TP- 27
SAMPLE DATE		_	_		07/24/96	_		07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH					0 FT			0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCB-209	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
SUM OF PCB CONGENERS X 2	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 U	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
TOXAPHENE	180 U	190 U	200 U	180 U	180 U	180 UJ	170 U	170 U	180 U	170 U	180 U	180 U	180 U
METALS (MG/KG)													
ALUMINUM	13200	12700	8290	5820	5280	5250	4920	5980	3950	4810	7830	3810	3840
ANTIMONY	8.7 UJ	10.4 UJ	11.1 UJ	8.1 UJ	7.9 UJ	9.4 UJ	10.9 UJ	9.7 UJ	8.4 UJ	9.7 UJ	7.8 UJ	9.4 UJ	8 UJ
ARSENIC	20.1	19.3	4.7	3.9	4.2 J	5 J	2.6 J	4.5 J	5.1 J	5.3 J	8.8 J	2.6	3.3 UJ
BARIUM	21.4	24	49.4	14.5	28.6 J	11.1	5.1	13.5	8.3	9.5	15.1 J	13.5	7.1 J
BERYLLIUM	0.42 J	0.47	1.1	0.23 J	0.18 J	0.23 J	0.21 U	0.23 J	0.21 J	0.19 U	0.31 J	0.29 J	0.15 UJ
CADMIUM	0.88 J	1 J	0.85 J	0.75 J	0.45 U	0.54 U	0.63 U	0.56 U	0.49 U	0.56 U		0.54 UJ	0.46 UJ
CALCIUM	1070	957	1780	426	386	353	569	342	324	237	571	674	265
CHROMIUM	18.2	16.8	24.1	11	6.6	7	7.9		5.2	5.8	· · ·	•	0.0
COBALT	14.4 J	12.2 J	14.7	7.6 J	8	8	3.4	8.6	9.1	7.9			
COPPER	31.8	29.6	111	23.1	22.9	26.9	4.3	_0.0	19.3	18.8		_	16.4 J
IRON	32500	31200	19600	23200	15400	17400	11200	18100	15900	15900	19400	7770	13200
LEAD	14.7	27.4	85.5	26.2	20.6 J	14.8 J	3.7 J	14.2 J	9.5 J	9.8 J		9.7	
MAGNESIUM	3970	3430	2290	2310	2150	2140	1870		1610			_	
MANGANESE	421 J	349 J	187	325 J	284 J	299 J	84.1 J	306 J	322 J	259 J		157	
MERCURY	0.11 U	0.13 U	0.1 U	0.08 U	0.05 U	0.05 J	0.05 U		0.05 U	0.05 U		0.09 U	
NICKEL	27.1	24.4	68.5	15.6	13 UJ	14 UJ	9.3 UJ	14.4 UJ	14.3 UJ	12.4 UJ	_	7.8	
POTASSIUM	321	307	483	606	311	382	236		297	318	_		_
SELENIUM	0.74 J	1.2	0.99 J	0.62 U	0.64 J	0.72 U	0.84 U		0.66 J	0.75 U		0.72 U	
SILVER	1 U	1.2 U	1.3 U	0.93 U	0.91 U	1.1 U	1.3 U		0.97 U	1.1 U			
SODIUM	69.7 U	40 U	172	87.9	35.8	33.2	34.1	29.7	19.7 J	22.8	32.4	45.1 U	11.7 U

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 8 of 18

	DSY-S- TP12- 0001	DSY-S- TP15- 0001	TP16- 0001	TP17- 0001	TP18- 0001		TP19- 0001	TP20- 0001	TP21- 0001	DSY-S- TP22- 0001	TP23- 0001	DSY-S- TP26- 0001	DSY-S- TP27- 0001
LOCATION ID	DSY-TP- 12	DSY-TP- 15	DSY-TP- 16	DSY-TP- 17	DSY-TP- 18	DSY-TP- 18	DSY-TP- 19	_	DSY-TP- 21	DSY-TP- 22	DSY-TP- 23	DSY-TP- 26	DSY-TP- 27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
THALLIUM	1 UJ	1.2 UJ	1.3 UJ	0.93 UJ	0.91 UJ	1.1 UJ	1.3 UJ	1.1 UJ	0.97 UJ	1.1 UJ	0.9 UJ	1.1 UJ	0 R
VANADIUM	18.9 J	21.8 J	22.4	13.7 J	9.9 J	9.2	8.6	10.2	7.6	8.4	12.2 J	6.8	6.5
ZINC	70.2	71	883	60	76.4	77.8	48	41	40.6	44.4	42.4	44.3	30.3 J
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 UJ	50 U	33	50 U	5.2 J	5.3 J	50 U	50 U	50 U	49 UJ	49 UJ	49 U	50 UJ
MONOBUTYLTIN	50 UJ	50 U	33	50 U	50 UJ	49 U	50 U	50 U	50 U	49 UJ	49 UJ	49 U	50 UJ
TETRABUTYLTIN	50 UJ	8.8 J	50 U	50 U	50 UJ	49 U	50 U	2.5 J	3.7 J	5.8 J	3.8 J	49 U	50 UJ
TRIBUTYLTIN	50 UJ	4.8 J	30 J	50 U	3.6 J	49 U	50 U	50 U	50 U	49 UJ	9.9 J	49 U	50 UJ
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	2000 J	68	4900	170	170	120 U	310	200	170 U	160 U	290	320	61
TCLP METALS (UG/L)													
ARSENIC	4 U	5.3 UJ	6.2 UJ	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
BARIUM	306	186	193	114 U	184	111 U	41.3 U	203	167	110 U	140 U	411	719 U
CADMIUM	3 U	3 U	3.1 UJ	3 U	5.1 UJ	3 U	3 U	3 U	4.2 UJ	3 U	3 U	3 U	3 U
CHROMIUM	6 U	6 U	6.5 UJ	7.1 UJ	10.2 UJ	6.1 UJ	6 U	9.8 UJ	12 UJ	6 U	6.3 UJ	6 U	16.6
LEAD	12.8		71.8	13.1	12.4	12.1	1.9 UJ	9.7	4.4 U	3.3 U	5.2 U	29	5.7 U
MERCURY	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U		0.1 U		0.1 U	0.1 U		0.1 UJ	0.1 U
SELENIUM	7.7	4 U	4 U		5.1 UJ	5.3 UJ	6.1 UJ	4.3 UJ	5.7 UJ	6.2 UJ	7 UJ	8.1	4 U
SILVER	0 R	0 R	0 R	0 R	6 U	6 U	6 U	6 U	6 U	6 U	6 U	0 R	6 UJ

# TABLE ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 9 of 18

SAMPLE ID	DSY-S- TP12- 0001	DSY-S- TP15- 0001	TP16-	DSY-S- TP17- 0001	TP18-	TP18-	DSY-S- TP19- 0001	TP20-	DSY-S- TP21- 0001	DSY-S- TP22- 0001	TP23-	TP26-	DSY-S- TP27- 0001
LOCATION ID	DSY-TP- 12	DSY-TP- 15	DSY-TP- 16	DSY-TP- 17	DSY-TP- 18	DSY-TP- 18	_	DSY-TP- 20	DSY-TP- 21	DSY-TP- 22	DSY-TP- 23	DSY-TP- 26	DSY-TP- 27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

**TABLE** 

#### ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 10 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
SAMPLE ID	TP12-	TP28-	TP28-
	0001	0001	0001-D
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
VOLATILES (UG/KG)			
1,1,1-TRICHLOROETHANE	11 U	11 U	11 U
1,1,2,2-	11 U	11 U	11 UJ
TETRACHLOROETHANE			
1,1,2-TRICHLOROETHANE	11 U	11 U	11 U
1,1-DICHLOROETHANE	11 U	11 U	11 U
1,1-DICHLOROETHENE	11 U	11 U	11 U
1,2-DICHLOROETHANE	11 U	11 U	11 U
1,2-DICHLOROPROPANE	11 U	11 U	11 U
2-BUTANONE	11 U	11 U	11 U
2-HEXANONE	11 U	11 U	11 UJ
4-METHYL-2-PENTANONE	11 U	11 U	11 UJ
ACETONE	11 U	11 U	11 U
BENZENE	11 U	11 U	11 U
BROMODICHLOROMETHAN E	11 U	11 U	11 U
BROMOFORM	11 U	11 U	11 U
BROMOMETHANE	11 U	11 U	11 U
CARBON DISULFIDE	11 U	11 U	11 U
CARBON TETRACHLORIDE	11 U	11 U	11 U
CHLOROBENZENE	11 U	11 U	11 UJ
CHLORODIBROMOMETHAN E	11 U	11 U	11 U
CHLOROETHANE	11 U	11 UJ	11 U
CHLOROFORM	11 U	11 U	11 U
CHLOROMETHANE	11 U	11 U	11 U

TABLE

#### ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 11 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP28-	TP28-
	0001	0001	0001-D
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
CIS-1,3-	11 U	11 U	11 U
DICHLOROPROPENE			
ETHYLBENZENE	11 U	11 U	11 UJ
METHYLENE CHLORIDE	11 U	21 U	13 U
STYRENE	11 U	11 U	11 UJ
TETRACHLOROETHENE	11 U	11 U	11 UJ
TOLUENE	11 U	11 U	11 UJ
TOTAL 1,2-	11 U	11 U	11 U
DICHLOROETHENE			
TOTAL XYLENES	11 U	11 U	11 UJ
TRANS-1,3- DICHLOROPROPENE	11 U	11 U	11 U
TRICHLOROETHENE	11 U	11 U	11 U
VINYL CHLORIDE	11 U	11 U	11 U
SEMIVOLATILES (UG/KG)			
1,2,4-TRICHLOROBENZENE	350 U	3700 UJ	330 U
1,2-DICHLOROBENZENE	350 U	3700 UJ	330 U
1,3-DICHLOROBENZENE	350 U	3700 UJ	330 U
1,4-DICHLOROBENZENE	350 U	3700 UJ	330 U
2,2'-OXYBIS(1-	350 U	3700 UJ	330 U
CHLOROPROPANE)			
2,4,5-TRICHLOROPHENOL	880 U	9200 UJ	830 U
2,4,6-TRICHLOROPHENOL	350 U	3700 UJ	330 U
2,4-DICHLOROPHENOL	350 U	3700 UJ	330 U
2,4-DIMETHYLPHENOL	350 U	3700 UJ	330 U
2,4-DINITROPHENOL	880 UJ	9200 UJ	830 U

#### **TABLE**

#### ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 12 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
CAIN LE ID	TP12-	TP28-	TP28-
	0001	0001	0001-D
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
2,4-DINITROTOLUENE	350 U	3700 UJ	330 U
2,6-DINITROTOLUENE	350 U	3700 UJ	330 U
2-CHLORONAPHTHALENE	350 U	3700 UJ	330 U
2-CHLOROPHENOL	350 U	3700 UJ	330 U
2-METHYLNAPHTHALENE	350 U	3700 UJ	330 U
2-METHYLPHENOL	350 U	3700 UJ	330 U
2-NITROANILINE	880 U	9200 UJ	830 U
2-NITROPHENOL	350 U	3700 UJ	330 U
3,3'-DICHLOROBENZIDINE	350 U	3700 UJ	330 U
3-NITROANILINE	880 U	9200 UJ	830 U
4,6-DINITRO-2-	880 U	9200 UJ	830 U
METHYLPHENOL			
4-BROMOPHENYL PHENYL ETHER	350 U	3700 UJ	330 U
4-CHLORO-3- METHYLPHENOL	350 U	3700 UJ	330 U
4-CHLOROANILINE	350 U	3700 UJ	330 U
4-CHLOROPHENYL PHENYL ETHER	350 U	3700 UJ	330 U
4-METHYLPHENOL	350 U	3700 UJ	330 U
4-NITROANILINE	880 U	9200 UJ	830 U
4-NITROPHENOL	880 UJ	9200 UJ	830 U
ACENAPHTHENE	350 U	3700 UJ	37 J
ACENAPHTHYLENE	350 U	3700 UJ	330 U

TABLE

#### ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 13 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
SAMIFLE ID	TP12-	TP28-	TP28-
	0001	0001	0001-D
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
ANTHRACENE	350 U	3700 UJ	92 J
BENZO(A)ANTHRACENE	350 U	710 J	500
BENZO(A)PYRENE	350 U	680 J	380 J
BENZO(B)FLUORANTHENE	350 U	1000 J	610 J
BENZO(G,H,I)PERYLENE	350 U	3700 UJ	210 J
BENZO(K)FLUORANTHENE	350 U	3700 UJ	210 J
BIS(2-	350 U	3700 UJ	330 U
CHLOROETHOXY)METHAN			
E			
BIS(2-	350 U	3700 UJ	330 U
CHLOROETHYL)ETHER BIS(2-	350 U	3700 UJ	330 U
ETHYLHEXYL)PHTHALATE	350 0	3700 03	330 0
BUTYL BENZYL	350 U	3700 UJ	330 U
PHTHALATE			
CARBAZOLE	350 U	3700 UJ	52 J
CHRYSENE	350 U	690 J	470
DIBENZO(A,H)ANTHRACEN	350 U	3700 UJ	330 U
E			
DIBENZOFURAN	350 U	3700 UJ	330 U
DIETHYL PHTHALATE	350 U	3700 UJ	330 U
DIMETHYL PHTHALATE	350 U	3700 UJ	330 U
DI-N-BUTYL PHTHALATE	350 U	3700 UJ	330 U
DI-N-OCTYL PHTHALATE	350 U	3700 UJ	330 U
FLUORANTHENE	350 U	1400 J	920
FLUORENE	350 U	3700 UJ	52 J

TABLE

#### ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 14 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
SAMPLE ID	TP12-	TP28-	TP28-
	0001	0001	0001-D
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
HEXACHLOROBENZENE	350 U	3700 UJ	330 U
HEXACHLOROBUTADIENE	350 U	3700 UJ	330 U
HEXACHLOROCYCLOPENT ADIENE	350 U	3700 UJ	330 U
HEXACHLOROETHANE	350 U	3700 UJ	330 U
HIGH MOLECULAR WEIGHT PAHS	350 U	6300	4420
INDENO(1,2,3-CD)PYRENE	350 U	520 J	240 J
ISOPHORONE	350 U	3700 UJ	330 U
LOW MOLECULAR WEIGHT PAHS	350 U	730	731
NAPHTHALENE	350 U	3700 UJ	330 U
NITROBENZENE	350 U	3700 UJ	330 U
N-NITROSO-DI-N- PROPYLAMINE	350 U	3700 UJ	330 U
N-	350 U	3700 UJ	330 U
NITROSODIPHENYLAMINE			
PENTACHLOROPHENOL	880 U	9200 UJ	830 U
PHENANTHRENE	350 U	730 J	550
PHENOL	350 U	3700 UJ	330 U
PYRENE	350 U	1300 J	880
TOTAL PAHS	350 U	7030	5151
PESTICIDES/PCBS (UG/KG)			
4,4'-DDD	3.5 U	3.6 U	3.3 U
4,4'-DDE	3.5 U	22	17

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 15 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
SAMPLE ID	TP12-	TP28-	TP28-
	0001	0001	0001-D
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
4,4'-DDT	3.5 U	56	45
ALDRIN	1.8 U	1.9 U	1.7 U
ALPHA-BHC	1.8 U	1.9 U	1.7 U
ALPHA-CHLORDANE	1.8 U	7.3	8.9
AROCLOR-1016	35 U	36 U	33 U
AROCLOR-1221	35 U	73 U	66 U
AROCLOR-1232	35 U	36 U	33 U
AROCLOR-1242	35 U	36 U	33 U
AROCLOR-1248	35 U	36 U	33 U
AROCLOR-1254	35 U	36 U	33 U
AROCLOR-1260	35 U	36 U	33 U
BETA-BHC	1.8 U	1.9 U	1.7 U
DELTA-BHC	1.8 U	1.9 U	1.7 U
DIELDRIN	3.5 U	3.6 U	3.3 U
ENDOSULFAN I	1.8 U	1.9 U	1.7 U
ENDOSULFAN II	3.5 U	3.6 U	3.3 U
ENDOSULFAN SULFATE	3.5 U	3.6 U	3.3 U
ENDRIN	3.5 U	3.6 U	3.3 U
ENDRIN ALDEHYDE	3.5 U	3.6 U	3.3 U
ENDRIN KETONE	3.5 U	3.6 U	3.3 U
GAMMA-BHC (LINDANE)	1.8 U	1.9 U	1.7 U
GAMMA-CHLORDANE	1.8 U	1.9 UJ	6.3 J
HEPTACHLOR	1.8 U	1.9 U	1.7 U
HEPTACHLOR EPOXIDE	1.8 U	4.2	2.6
METHOXYCHLOR	18 U	19 U	17 U

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED)

#### FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 16 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP28-	TP28-
	0001	0001	0001-D
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
PCB-209	3.5 U	3.6 U	3.3 U
SUM OF PCB CONGENERS X 2	3.5 U	3.6 U	3.3 U
TOXAPHENE	180 U	190 U	170 U
METALS (MG/KG)			
ALUMINUM	13200	9100	10200
ANTIMONY	8.7 UJ	9 UJ	10.1 UJ
ARSENIC	20.1	10.9 J	10.8 J
BARIUM	21.4	26.6 J	29.4 J
BERYLLIUM	0.42 J	0.38 J	0.39 J
CADMIUM	0.88 J	0.52 UJ	0.58 UJ
CALCIUM	1070	562	598
CHROMIUM	18.2	12 J	13 J
COBALT	14.4 J	7.3 J	8.1 J
COPPER	31.8	20.4 J	20.7 J
IRON	32500	19100	20300
LEAD	14.7	115 J	109 J
MAGNESIUM	3970	2060	2310
MANGANESE	421 J	314 J	349 J
MERCURY	0.11 U	0.17 U	0.17 U
NICKEL	27.1	14.5 J	17.8 J
POTASSIUM	321	198	247
SELENIUM	0.74 J	0 R	0 R
SILVER	1 U	1 UJ	1.2 UJ
SODIUM	69.7 U	22.5 UJ	34.7 UJ

TABLE

#### ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 17 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
J == 12	TP12-	TP28-	TP28-
	0001	0001	0001-D
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
THALLIUM	1 UJ	0 R	0 R
VANADIUM	18.9 J	39	40
ZINC	70.2	59.6 J	63.4 J
MISCELLANEOUS			
PARAMETERS (UG/KG)			
DIBUTYLTIN	50 UJ	50 U	49 U
MONOBUTYLTIN	50 UJ	50 U	49 U
TETRABUTYLTIN	50 UJ	50 U	49 U
TRIBUTYLTIN	50 UJ	50 U	49 U
PETROLEUM			
HYDROCARBONS (MG/KG)			
CREOSOTE	2000 J	130 J	76 J
TCLP METALS (UG/L)	2000 0	100 0	700
ARSENIC	4 U	4 U	4 U
BARIUM	306	556 U	648 U
CADMIUM	3 U	3 U	3 U
CHROMIUM	6 U	6 U	10.6 J
LEAD	12.8	71.9	68.6
MERCURY	0.1 UJ		0.1 U
SELENIUM	7.7	4.3 UJ	4 U
SILVER	0 R	8.1 UJ	6 UJ

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**TABLE** 

#### ANALYTICAL RESULTS - SURFACE SOIL (SO\_SS\_PAVED) FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND PAGE 18 of 18

SAMPLE ID	DSY-S-	DSY-S-	DSY-S-
	TP12-	TP28-	TP28-
	0001	0001	0001-D
LOCATION ID	DSY-TP-	DSY-TP-	DSY-TP-
	12	28	28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
			•